Cisco ATA 186 and Cisco ATA 188 Analog Telephone Adaptor Administrator's Guide (SCCP)

Corporate Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
http://www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 526-4100

Text Part Number: OL-3141-01

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GLOSSARY

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Preface

Overview

The *Cisco ATA 186 and Cisco ATA 188 Analog Telephone Adaptor Administrator's Guide (SCCP)* provides the information you need to install, configure and manage the Cisco ATA 186 and Cisco ATA 188 on a Skinny Client Control Protocol (SCCP) network.

This guide does not cover information related to the implementation of an SCCP Voice over IP (VoIP) network.

Note The term *Cisco ATA* is used throughout this manual to refer to both the Cisco ATA 186 and the Cisco ATA 188, unless differences between the Cisco ATA 186 and Cisco ATA 188 are explicitly stated.

Audience

This guide is intended mainly for service providers and network administrators who administer VoIP services using the Cisco ATA. Many of these tasks impact the ability of the Cisco ATA to function on the network, and require an understanding of IP networking and telephony concepts. However, some end-user procedures are included where necessary with instructions to the administrator about how to provide the end user with the pertinent information.

Organization

Table 1 provides an overview of the organization of this guide.

Table 1 Cisco ATA 186 and Cisco ATA 188 Analog Telephone Administrator's Guide (SCCP) Organization

Chapter	Description
Chapter 1, "Cisco Analog Telephone Adaptor Overview"	Provides descriptions of hardware and software features of the Cisco ATA Analog Telephone Adaptor along with a brief overview of the Skinny Client Control Protocol (SCCP).
Chapter 2, "Installing the Cisco ATA"	Provides information about installing the Cisco ATA.
Chapter 3, "Configuring the Cisco ATA for SCCP"	Provides information about how to configure the Cisco ATA and the different configuration methods you can use.

Table 1 Cisco ATA 186 and Cisco ATA 188 Analog Telephone Administrator's Guide (SCCP) Organization (continued)

Chapter	Description
Chapter 4, "Adding the Cisco ATA to the Cisco CallManager"	Provides information about adding the Cisco ATA to the Cisco CallManager environment.
Chapter 5, "Parameters and Defaults"	Provides information on the parameters and defaults that you can use to configure the Cisco ATA.
Chapter 6, "Configuring and Debugging Fax Services"	Provides instructions for configuring both ports of the Cisco ATA to support fax transmission.
Chapter 7, "Upgrading the Cisco ATA Signaling Image."	Provides instructions for remotely upgrading Cisco ATA software.
Chapter 8, "Troubleshooting"	Provides basic testing and troubleshooting procedures for the Cisco ATA.
Appendix A, "How to Use Pre-call and Mid-call Services"	Provides end-user procedures on how to use pre-call services and mid-call services that the Cisco ATA supports.
Appendix B, "Voice Menu Codes"	Provides a quick-reference list of the voice configuration menu options for the Cisco ATA.
Appendix C, "Cisco ATA Specifications"	Provides physical specifications for the Cisco ATA.
Appendix D, "SCCP Call Flows"	Provides Cisco ATA call flows for SCCP scenarios.
Appendix E, "Performing a Cross-Protocol Upgrade"	Provides instructions on changing from SCCP to a SIP, MGCP or H.323 signaling image.
Glossary	Provides definitons of commonly used terms.
Index	Provides reference information.

Conventions

This document uses the following conventions:

- Alternative keywords are grouped in braces and separated by vertical bars (for example, {**x** | **y** | **z**}).
- Arguments for which you supply values are in *italic* font.
- Commands and keywords are in **boldface** font.
- Elements in square brackets ([ ]) are optional.
- Information you must enter is in `boldface screen` font.
- Optional alternative keywords are grouped in brackets and separated by vertical bars (for example, [**x** | **y** | **z**]).
- Terminal sessions and information the system displays are in `screen` font.

Note Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the publication.

Timesaver Means *the described action saves time*. You can save time by performing the action described in the paragraph.

Tip Means *the following information will help you solve a problem*. The tips information might not be troubleshooting or even an action, but could be useful information, similar to a Timesaver.

Caution Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

Warning **This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. (To see translations of the warnings that appear in this publication, refer to the appendix "Translated Safety Warnings.")**

Waarschuwing **Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van standaard maatregelen om ongelukken te voorkomen. (Voor vertalingen van de waarschuwingen die in deze publicatie verschijnen, kunt u het aanhangsel "Translated Safety Warnings" (Vertalingen van veiligheidsvoorschriften) raadplegen.)**

Varoitus **Tämä varoitusmerkki merkitsee vaaraa. Olet tilanteessa, joka voi johtaa ruumiinvammaan. Ennen kuin työskentelet minkään laitteiston parissa, ota selvää sähkökytkentöihin liittyvistä vaaroista ja tavanomaisista onnettomuuksien ehkäisykeinoista. (Tässä julkaisussa esiintyvien varoitusten käännökset löydät liitteestä "Translated Safety Warnings" (käännetyt turvallisuutta koskevat varoitukset).)**

Attention **Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant entraîner des blessures. Avant d'accéder à cet équipement, soyez conscient des dangers posés par les circuits électriques et familiarisez-vous avec les procédures courantes de prévention des accidents. Pour obtenir les traductions des mises en garde figurant dans cette publication, veuillez consulter l'annexe intitulée « Translated Safety Warnings » (Traduction des avis de sécurité).**

Warnung **Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu einer Körperverletzung führen könnte. Bevor Sie mit der Arbeit an irgendeinem Gerät beginnen, seien Sie sich der mit elektrischen Stromkreisen verbundenen Gefahren und der Standardpraktiken zur Vermeidung von Unfällen bewußt. (Übersetzungen der in dieser Veröffentlichung enthaltenen Warnhinweise finden Sie im Anhang mit dem Titel "Translated Safety Warnings" (Übersetzung der Warnhinweise).)**

Avvertenza **Questo simbolo di avvertenza indica un pericolo. Si è in una situazione che può causare infortuni. Prima di lavorare su qualsiasi apparecchiatura, occorre conoscere i pericoli relativi ai circuiti elettrici ed essere al corrente delle pratiche standard per la prevenzione di incidenti. La traduzione delle avvertenze riportate in questa pubblicazione si trova nell'appendice, "Translated Safety Warnings" (Traduzione delle avvertenze di sicurezza).**

Advarsel **Dette varselsymbolet betyr fare. Du befinner deg i en situasjon som kan føre til personskade. Før du utfører arbeid på utstyr, må du være oppmerksom på de faremomentene som elektriske kretser innebærer, samt gjøre deg kjent med vanlig praksis når det gjelder å unngå ulykker. (Hvis du vil se oversettelser av de advarslene som finnes i denne publikasjonen, kan du se i vedlegget "Translated Safety Warnings" [Oversatte sikkerhetsadvarsler].)**

Aviso **Este símbolo de aviso indica perigo. Encontra-se numa situação que lhe poderá causar danos fisicos. Antes de começar a trabalhar com qualquer equipamento, familiarize-se com os perigos relacionados com circuitos eléctricos, e com quaisquer práticas comuns que possam prevenir possíveis acidentes. (Para ver as traduções dos avisos que constam desta publicação, consulte o apêndice "Translated Safety Warnings" - "Traduções dos Avisos de Segurança").**

¡Advertencia! **Este símbolo de aviso significa peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considerar los riesgos que entraña la corriente eléctrica y familiarizarse con los procedimientos estándar de prevención de accidentes. (Para ver traducciones de las advertencias que aparecen en esta publicación, consultar el apéndice titulado "Translated Safety Warnings.")**

Varning! **Denna varningssymbol signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanligt förfarande för att förebygga skador. (Se förklaringar av de varningar som förekommer i denna publikation i appendix "Translated Safety Warnings" [Översatta säkerhetsvarningar].)**

Related Documentation

- *Read Me First - ATA Boot Load Information*
- *Cisco ATA 186 and Cisco 188 Analog Telephone Adaptor At a Glance*
- *Regulatory Compliance and Safety Information for the Cisco ATA 186 and Cisco 188*
- *Cisco ATA Release Notes*
- *Configuring Cisco IP Phones, Users, and Features in Cisco CallManager*
- *Cisco IP Phone Administration Guide for Cisco CallManager*
- Cisco IOS Telephony Service documentation

Obtaining Documentation

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Cisco.com

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http://www.cisco.com/public/countries_languages.shtml

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- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco Systems Corporate Headquarters (California, U.S.A.) at 408 526-7208 or, elsewhere in North America, by calling 800 553-NETS (6387).

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Technical Assistance Center

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- Priority level 4 (P4)—You need information or assistance concerning Cisco product capabilities, product installation, or basic product configuration.
- Priority level 3 (P3)—Your network performance is degraded. Network functionality is noticeably impaired, but most business operations continue.
- Priority level 2 (P2)—Your production network is severely degraded, affecting significant aspects of business operations. No workaround is available.
- Priority level 1 (P1)—Your production network is down, and a critical impact to business operations will occur if service is not restored quickly. No workaround is available.

Cisco TAC Website

You can use the Cisco TAC website to resolve P3 and P4 issues yourself, saving both cost and time. The site provides around-the-clock access to online tools, knowledge bases, and software. To access the Cisco TAC website, go to this URL:

http://www.cisco.com/tac

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http://tools.cisco.com/RPF/register/register.do

If you are a Cisco.com registered user, and you cannot resolve your technical issues by using the Cisco TAC website, you can open a case online at this URL:

http://www.cisco.com/en/US/support/index.html

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Before calling, please check with your network operations center to determine the level of Cisco support services to which your company is entitled: for example, SMARTnet, SMARTnet Onsite, or Network Supported Accounts (NSA). When you call the center, please have available your service agreement number and your product serial number.

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  http://www.cisco.com/en/US/about/ac123/ac114/about_cisco_packet_magazine.html

- *iQ Magazine* is the Cisco monthly periodical that provides business leaders and decision makers with the latest information about the networking industry. You can access *iQ Magazine* at this URL:

  http://business.cisco.com/prod/tree.taf%3fasset_id=44699&public_view=true&kbns=1.html

- *Internet Protocol Journal* is a quarterly journal published by Cisco Systems for engineering professionals involved in the design, development, and operation of public and private internets and intranets. You can access the *Internet Protocol Journal* at this URL:

  http://www.cisco.com/en/US/about/ac123/ac147/about_cisco_the_internet_protocol_journal.html

- Training—Cisco offers world-class networking training, with current offerings in network training listed at this URL:

  http://www.cisco.com/en/US/learning/le31/learning_recommended_training_list.html

Cisco Analog Telephone Adaptor Overview

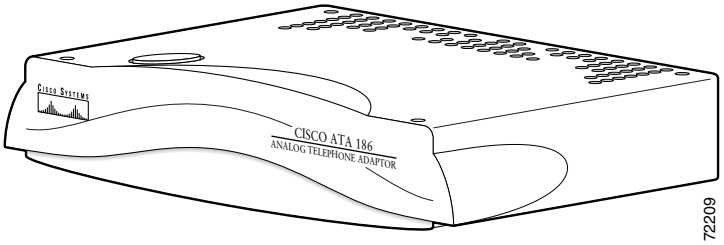
This section describes the hardware and software features of the Cisco Analog Telephone Adaptor (Cisco ATA) and includes a brief overview of the Skinny Client Control Protocol (SCCP).

The Cisco ATA analog telephone adaptors are handset-to-Ethernet adaptors that allow regular analog telephones to operate on IP-based telephony networks. Cisco ATAs support two voice ports, each with an independent telephone number. The Cisco ATA 188 also has an RJ-45 10/100BASE-T data port.

This section covers the following topics:

- Overview of the Skinny Client Control Protocol, page 1-2
- Hardware Overview, page 1-3
- Software Features, page 1-5
- Installation and Configuration Overview, page 1-9

Figure 1-1 Cisco ATA Analog Telephone Adaptor



The Cisco ATA, which operates with Cisco voice-packet gateways, uses broadband pipes deployed through digital subscriber line (DSL), fixed wireless, cable modem, and other Ethernet connections.

Note The term Cisco ATA refers to both the Cisco ATA 186 and the Cisco ATA 188, unless otherwise stated.

Figure 1-2 The Cisco ATA 186 as an Endpoint in an SCCP Network

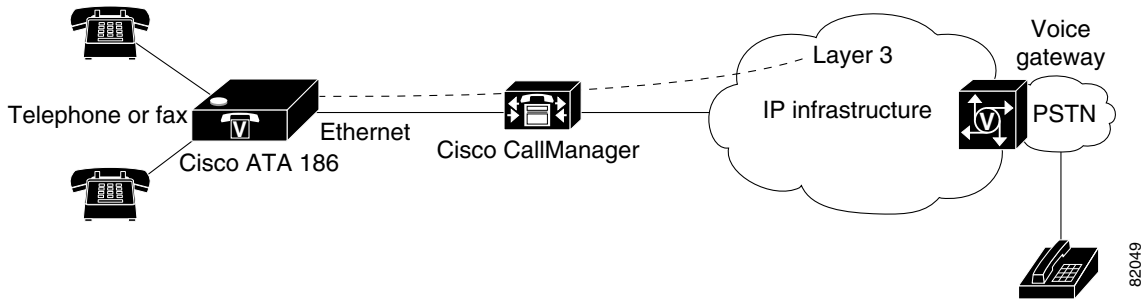
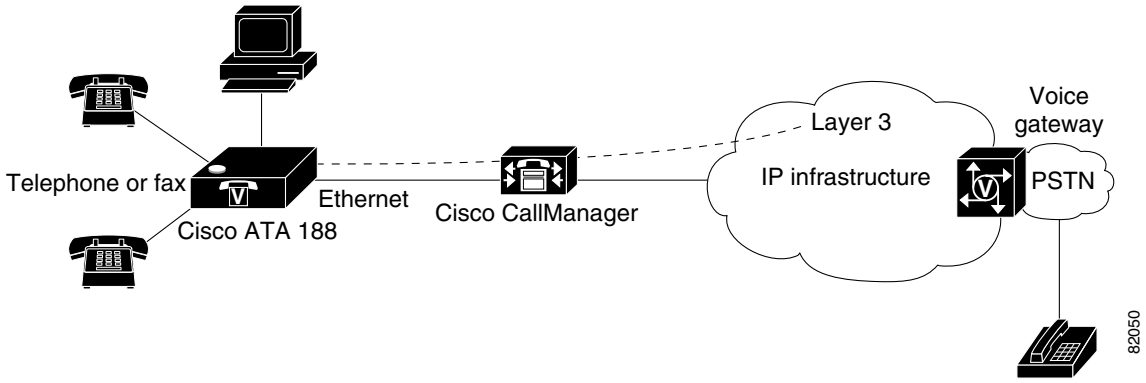


Figure 1-3 The Cisco ATA 188 as an Endpoint in an SCCP Network

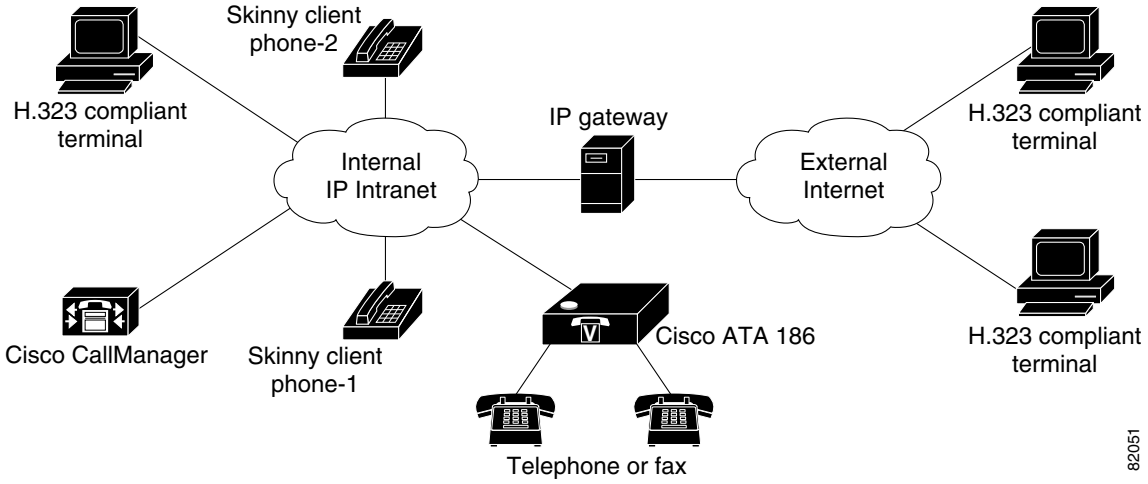


Overview of the Skinny Client Control Protocol

The Skinny Client Control Protocol (SCCP) is the Cisco standard for real-time calls and conferencing over Internet Protocol (IP). With SCCP, Cisco IP Phones can co-exist in an H.323 environment. When a Cisco CallManager is coupled with an H.323 Gatekeeper or an MGCP Call Agent, a Cisco ATA running SCCP interoperates with H.323 terminals on the far end to establish, control and clear audio calls.

Figure 1-4 illustrates the architecture of an SCCP network.

Figure 1-4 SCCP Architecture



Hardware Overview

Cisco ATAs are compact, easy-to-install devices. Figure 1-5 shows the rear panel of the Cisco ATA 186. Figure 1-6 shows the rear panel of the Cisco ATA 188.

Figure 1-5 Cisco ATA 186—Rear View

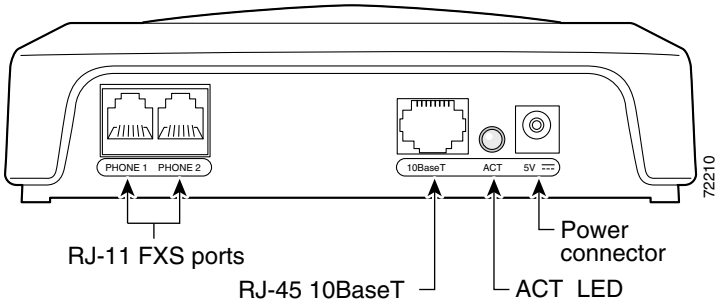
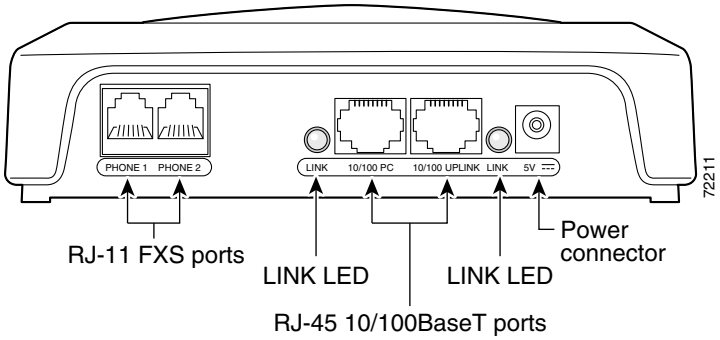


Figure 1-6 Cisco ATA 188—Rear View



The unit provides the following connectors and indicators:

- 5V power connector.
- Two RJ-11 FXS (Foreign Exchange Station) ports—The Cisco ATA supports two independent RJ-11 telephone ports that can connect to any standard analog telephone device. Each port supports either voice calls or fax sessions, and both ports can be used simultaneously.

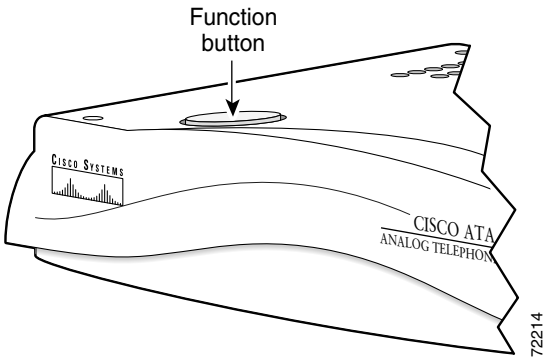
Note The Cisco ATA186-I1 and Cisco ATA188-I1 provide 600-ohm resistive impedance. The Cisco ATA186-I2 and Cisco ATA188-I2 provide 270 ohm + 750 ohm // 150-nF complex impedance. The impedance option is requested when you place your order and should match your specific application. If you are not sure of the applicable configuration, check your country or regional telephone impedance requirements.

- Ethernet ports
  - The Cisco ATA 186 has one RJ-45 10BASE-T uplink Ethernet port to connect the Cisco ATA 186 to a 10/100BASE-T hub or another Ethernet device.
  - The Cisco ATA 188 has two Ethernet ports: an RJ-45 10/100BASE-T uplink port to connect the Cisco ATA 188 to a 10/100BASE-T hub or another Ethernet device and an RJ-45 10/100BASE-T data port to connect an Ethernet-capable device, such as a computer, to the network.

Note The Cisco ATA 188 performs auto-negotiation for duplexity and speed and is capable of 10/100 Mbps, full-duplex operation. The Cisco ATA 186 is fixed at 10 Mbps, half-duplex operation.

- The Cisco ATA 188 RJ-45 LED shows network link and activity. The LED blinks twice when the Cisco ATA is first powered on, then turns off if there is no link or activity. The LED blinks to show network activity and is solid when there is a link.
- The Cisco ATA 186 RJ-45 LED is solid when the Cisco ATA is powered on and blinks to show network activity.
- Function button—The function button is located on the top panel of the unit (see Figure 1-7).

Figure 1-7 Function Button



The function button lights when you pick up the handset of a telephone attached to the Cisco ATA. The button blinks quickly when the Cisco ATA is upgrading its configuration.

Note If the function button blinks slowly, the Cisco ATA cannot find the DHCP server. Check your Ethernet connections and make sure the DHCP server is available.

Pressing the function button allows you to access to the voice configuration menu. For additional information about the voice configuration menu, see the "Voice Configuration Menu" section on page 3-18.

Caution Never press the function button during an upgrade process. Doing so may interfere with the process and may permanently disable the Cisco ATA.

Software Features

This section contains topics that cover the protocols and services that the Cisco ATA supports:

- SCCP Version, page 1-5
- Voice Codecs Supported, page 1-5
- Additional Supported Signaling Protocols, page 1-6
- Other Supported Protocols, page 1-6
- Basic Services, page 1-6
- Fax Services, page 1-7
- Pre-call and Mid-call Services, page 1-7

SCCP Version

The Cisco ATA supports the Skinny Client Control Protocol (SCCP) Rev. 3.0 and 3.1.

Voice Codecs Supported

The Cisco ATA supports the following voice codecs (check your other network devices for the codecs they support):

- G.711µ-law
- G.711A-law
- G.723.1
- G.729
- G.729A
- G.729B
- G.729AB

When operating with a low-bit-rate codec, the Cisco ATA can support either two G.723.1 connections or one G.729 connection. The selection of G.723.1 or G.729 must be statically configured. When G.723.1 is the low-bit-rate codec, each FXS port is allocated with one G.723.1 connection. When G.729 is used, only one FXS port can use G.729. For more information, see the "LBRCodec" section on page 5-11 and "ConnectMode" section on page 5-13.

Additional Supported Signaling Protocols

In addition to SCCP, the Cisco ATA supports the following signaling protocols:

- Media Gateway Control Protocol (MGCP)
- H.323
- Session Initiation Protocol (SIP)

SCCP and MGCP share the same software image. SIP and H.323 also share a software image, which is separate from the SCCP/MGCP image. If you wish to perform a cross-protocol upgrade from SCCP to another signaling image, see Appendix E, "Performing a Cross-Protocol Upgrade."

Other Supported Protocols

Other protocols that the Cisco ATA supports include the following:

- 802.1Q VLAN tagging
- Cisco Discovery Protocol (CDP)
- Domain Name System (DNS)
- Dynamic Host Configuration Protocol (DHCP)
- Internet Control Message Protocol (ICMP)
- Internet Protocol (IP)
- Real-Time Transport Protocol (RTP)
- Transmission Control Protocol (TCP)
- Trivial File Transfer Protocol (TFTP)
- User Datagram Protocol (UDP)

Basic Services

For an alphabetical list of Cisco ATA basic services and the parameters for configuring each service, see Table 3-5 on page 3-8.

These services include the following features:

- Configurable tone (dial tone, busy tone, confirm tone, reorder tone, call waiting tone)
- IP address assignment—DHCP-provided or statically configured
- Cisco ATA configuration by means of the Cisco CallManager TFTP server, web browser, or voice configuration menu.
- VLAN configuration
- Caller ID format

- Ring cadence format
- Silence suppression
- Low-bit-rate codec selection
- RTP media port configuration
- Hook-flash detection timing configuration
- Cisco Discovery Protocol (CDP)
- User interface password
- UDP Type of Service (ToS) configuration
- 802.1P Class of Service (Cos) Bit configuration
- Debugging and diagnostic tools

Fax Services

The Cisco ATA supports two modes of fax services, in which fax signals are transmitted using the G.711 codec:

- Fax pass-through mode—Receiver-side Called Station Identification (CED) tone detection with automatic G.711A-law or G.711µ-law switching.
- Fax mode—The Cisco ATA is configured as a G.711-only device.

How you set Cisco ATA fax parameters depends on what network gateways are being used. You may need to modify the default fax parameter values (see Chapter 6, "Configuring and Debugging Fax Services").

Note Success of fax transmission depends on network conditions and fax modem response to these conditions. The network must have reasonably low network jitter, network delay, and packet loss rate.

Pre-call and Mid-call Services

This section provides an overview of telephone services that the Cisco ATA allows the user to perform either before or during a call. For end-user procedures on how to use these services, see Appendix A, "How to Use Pre-call and Mid-call Services."

This section contains the following topics:

- Pre-call Services, page 1-7
- Mid-call Services, page 1-8

Note The services listed in this section are supported by Cisco CallManager. For Cisco IOS Telephony Service (ITS)-supported services, refer to ITS documentation.

Pre-call Services

Table 1-1 lists the pre-call services that the Cisco ATA supports for the SCCP protocol. Table 1-1 also includes references to where the user procedure is described for each service.

Table 1-1 Pre-call Services and Where to Find End-user Procedures

Service	Procedure Reference
Voice mail access	Access Voicemail, page A-1
Forward all calls to another number	Activate Call-Forward-All, page A-2
Cancel the forwarding of all calls	Cancel Call-Forward-All, page A-2
Redial the most recent number dialed	Redial, page A-2
Use speed dial	Speed Dial, page A-2
Answer a call in your call-pickup group	Call Pickup, page A-3
Answer a call outside of your call-pickup group	Group Call Pickup, page A-3
Set up a conference	MeetMe Conference, page A-3

Mid-call Services

The method of initiating and using mid-call services for the SCCP protocol differs according to mode. The following three modes are available for invoking mid-call services:

- Bellcore Style (default)
- Cisco VG248 Style
- Cisco ATA Style

The mode can be configured using bits 28 and 29 of the ConnectMode parameter (see the "ConnectMode" section on page 5-13).

Table 1-2 lists the mid-call services that the Cisco ATA supports for each of the three modes. Table 1-2 also includes references to where the end-user procedure is described for each service.

Table 1-2 Mid-call Services and Where to Find End-user Procedures

Style and Related Services	Procedure Reference
Bellcore style (default) services: • Call transfer • Conference call	Bellcore Style, page A-4
Cisco VG248 style services: • Three-way call • Call transer • Conference call	Cisco VG248 Style, page A-5
Cisco ATA style services: • Call hold/resume • Call transfer • Conference call	Cisco ATA Style, page A-6

Installation and Configuration Overview

Table 1-3 provides the basic steps required to install and configure the Cisco ATA to make it operational in a typical Cisco CallManager environment.

Table 1-3 Overview of the Steps Required to Install and Configure the Cisco ATA and Make it Operational

Action	Reference
1. Plan the network and Cisco ATA configuration.	
2. Install the Ethernet connection.	
3. Install and configure the other network devices.	
4. Install the Cisco ATA but do not power up the Cisco ATA yet. **Note** If you power up the Cisco ATA before adding the Cisco ATA to the Cisco CallManager, you will need to perform a reset once you have added the Cisco ATA to the Cisco CallManager.	What the Cisco ATA Package Includes, page 2-2 Resetting the Cisco ATA Using Cisco CallManager, page 3-23
5. Download the desired Cisco ATA release software zip file from the Cisco web site, then configure the Cisco ATA.	Chapter 3, “Configuring the Cisco ATA for SCCP”
6. Add the Cisco ATA to the Cisco CallManager.	Chapter 4, “Adding the Cisco ATA to the Cisco CallManager”
7. Power up the Cisco ATA.	
8. Periodically, you can upgrade an individual Cisco ATA or all Cisco ATAs to a new signaling image by using the Cisco CallManager administration web pages.	Chapter 7, “Upgrading the Cisco ATA Signaling Image”

CHAPTER 2

Installing the Cisco ATA

This section provides instructions for installing the Cisco ATA 186 and Cisco ATA 188. Before you perform the installation, make sure you have met the following prerequisites:

- Planned the network and Cisco ATA configuration.
- Installed the Ethernet connection.
- Installed and configured the other network devices.

This section contains the following topics:

- Network Requirements, page 2-2
- Safety Recommendations, page 2-2
- What the Cisco ATA Package Includes, page 2-2
- What You Need, page 2-3
- Installation Procedure, page 2-3
- Power-Down Procedure, page 2-6

Note The term *Cisco ATA* is used throughout this manual to refer to both the Cisco ATA 186 and the Cisco ATA 188, unless differences between the Cisco ATA 186 and Cisco ATA 188 are explicitly stated.

Network Requirements

The Cisco ATA acts as an endpoint on an IP telephony network. The following equipment is required:

- Cisco CallManager version 3.0 or later
- Voice packet gateway—Required if you are connecting to the Public Switched Telephone Network (PSTN)
- Ethernet connection

Safety Recommendations

To ensure general safety, follow these guidelines:

- Do not get this product wet or pour liquids into this device.
- Do not open or disassemble this product.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.
- Use only the power cube that comes with the Cisco ATA.

Warning **Ultimate disposal of this product should be handled according to all national laws and regulations.**

Warning **Read the installation instructions before you connect the system to its power source.**

Warning **The plug-socket combination must be accessible at all times because it serves as the main disconnecting device.**

Warning **Do not work on the system or connect or disconnect cables during periods of lightning activity.**

For translated warnings, see the *Regulatory Compliance and Safety Information for the Cisco ATA 186 and Cisco ATA 188* manual.

What the Cisco ATA Package Includes

The Cisco ATA package contains the following items:

- Cisco ATA 186 or Cisco ATA 188 Analog Telephone Adaptor
- *Read Me First - ATA Boot Load Information*
- *Cisco ATA 186 and Cisco ATA 188 Analog Telephone Adaptor at a Glance*

- *Regulatory Compliance and Safety Information for the Cisco ATA 186 and Cisco ATA 188*
- 5V power adaptor
- Power cord

Note The Cisco ATA is intended for use only with the 5V DC power adaptor that comes with the unit.

What You Need

You also need the following items:

- Category-3 10BASE-T or 100BASE-T or better Ethernet cable. One cable is needed for each Ethernet connection.

  A Category-3 Ethernet cable supports 10BASE-T for up to 100 meters without quality degradation, and a Category-3 Ethernet cable supports 100BASE-T for up to 10 meters without quality degradation.

  For uplink connections, use a crossover Ethernet cable to connect the Cisco ATA to another Ethernet device (such as a router or PC) without using a hub. Otherwise, use straight-through Ethernet cables for both uplink and data port connections.
- Access to an IP network
- One or two analog Touch-Tone telephones or fax machines, or one of each

Installation Procedure

After the equipment is in place, see Figure 2-1 (for Cisco ATA 186) or Figure 2-2 (for Cisco ATA 188) and follow the next procedure to install the Cisco ATA.

Figure 2-1 Cisco ATA 186 Rear Panel Connections

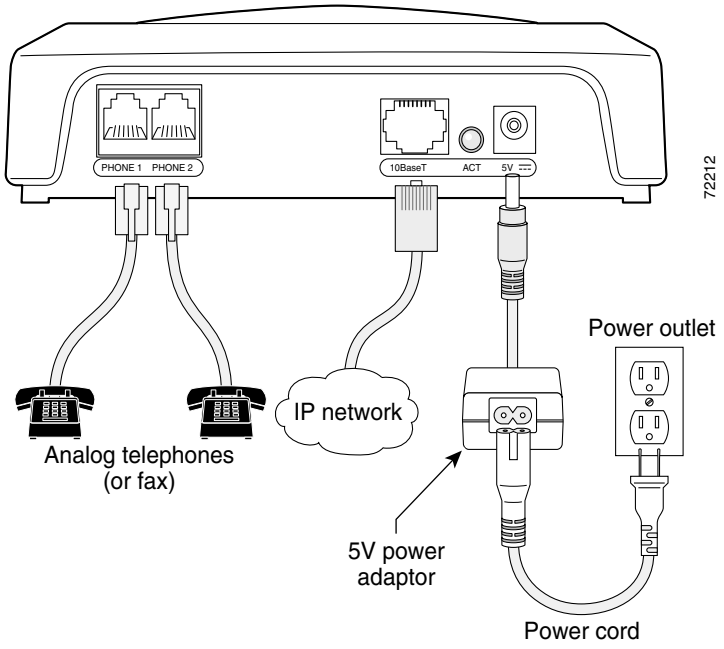
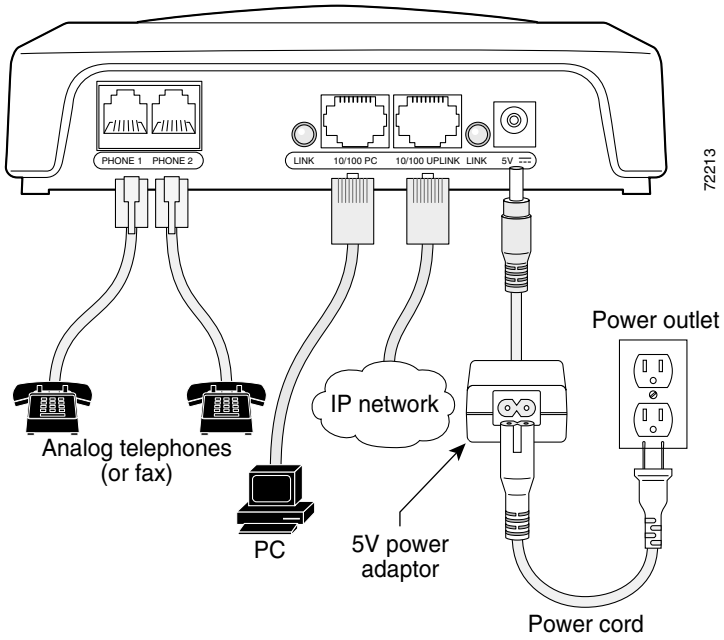


Figure 2-2 Cisco ATA 188 Rear Panel Connections



Procedure

Step 1 Place the Cisco ATA near an electrical power outlet.

Step 2 Connect one end of a telephone line cord to the **Phone 1** input on the rear panel of the Cisco ATA. Connect the other end to an analog telephone set.

If you are connecting a telephone set that was previously connected to an active telephone line, unplug the telephone line cord from the wall jack and plug it into the **Phone 1** input.

Warning **To reduce the risk of fire, use only No. 26 AWG or larger telecommunication line cord.**

Caution Do not connect the **Phone** input ports to a telephone wall jack. To avoid damaging the Cisco ATA or telephone wiring in the building, do not connect the Cisco ATA to the telecommunications network. Connect the **Phone** port to a telephone only, never to a telephone wall jack.

Note The telephone must be switched to tone setting (not pulse) for the Cisco ATA to operate properly.

Step 3 (Optional) Connect the telephone line cord of a second telephone to the **Phone 2** input port.

Note If you are connecting only one telephone to the Cisco ATA, you must use the **Phone 1** input port.

Step 4 Connect an Ethernet cable to the uplink RJ-45 connector on the Cisco ATA. For the Cisco ATA 186, this is the 10BASE-T connector; for the Cisco ATA 188, this is the 10/100UPLINK connector.

Note Use a crossover Ethernet cable to connect the Cisco ATA to another Ethernet device (such as a router or PC) without using a hub. Otherwise, use a straight-through Ethernet cable.

Step 5 (Cisco ATA 188 only—optional) Connect a straight-through Ethernet cable from your PC to the 10/100 PC RJ-45 connector on the Cisco ATA.

Step 6 Connect the socket end of the power cord to the 5V DC power adaptor.

Step 7 Insert the power adaptor cable into the power connector on the Cisco ATA.

Warning **This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that a fuse or circuit breaker no larger than 120 VAC, 15A U.S. (240VAC, 10A international) is used on the phase conductors (all current-carrying conductors).**

Step 8 Connect the plug end of the 5V DC power adaptor cord into an electrical power outlet.

When the Cisco ATA is properly connected and powered up, the green activity LED flashes to indicate network activity. This LED is labeled **ACT** on the rear panel of the Cisco ATA 186 and is labeled **LINK** on the rear panel of the Cisco ATA 188.

Caution Do not cover or block the air vents on either the top or the bottom surface of the Cisco ATA. Overheating can cause permanent damage to the unit.

For more information about LEDs and the function button, see the "Hardware Overview" section on page 1-3.

Power-Down Procedure

Caution If you need to power down Cisco ATA 186 or Cisco 188 at any time, use the following power-down procedure to prevent damage to the unit.

Procedure

Step 1 Unplug the RJ45 Ethernet cable

Step 2 Wait for 20 seconds.

Step 3 Unplug the power cable.

CHAPTER 3

Configuring the Cisco ATA for SCCP

This section describes how to configure the Cisco ATA to operate with the Skinny Client Control Protocol (SCCP) signaling image and how the Cisco ATA obtains the latest signaling image.

You can configure the Cisco ATA for use with SCCP with any of the following methods:

- By using the Cisco CallManager TFTP server—This is the Cisco-recommended method for deploying a large number of Cisco ATAs. This method allows you to set up a default configuration file for all Cisco ATAs in the network. Additionally, you can set up a configuration file that is unique to a specific Cisco ATA. When the Cisco ATA powers up or boots up from a reset, it automatically downloads its configuration file from the Cisco CallManager TFTP server and updates its configuration parameters.
- By using manual configuration:
  - Voice configuration menu—This is the method you must use if the process of establishing IP connectivity for the Cisco ATA requires changing the default network configuration settings. These settings are CDP, VLAN, and DHCP. You also can use the voice configuration menu to review all IP connectivity settings. The voice configuration menu can also be used when Web access is not available.
  - Web-based configuration—This method is convenient if you plan to deploy a small number of Cisco ATAs in your network. To use this method, the Cisco ATA must first obtain IP connectivity, either through the use of a DHCP server or by using the voice configuration menu to statically configure IP addresses.

This section contains the following topics:

- Default Boot Load Behavior, page 3-2—This section describes the process that the Cisco ATA follows by default when it boots up. It is very important to understand this process because, if your network environment is not set up to follow this default behavior, you need to make the applicable configuration changes. For example, by default, the Cisco ATA attempts to contact a DHCP server for the necessary IP addresses to achieve network connectivity. However, if your network does not use a DHCP server, you must manually configure various IP settings as described in this section.
- Specifying a Preconfigured VLAN ID or Disabling VLAN IP Encapsulation, page 3-3—This section includes a table of the parameters you can configure for VLAN and CDP settings.
- Steps Needed to Configure the Cisco ATA, page 3-6—This section provides tables that summarize the general configuration steps you must follow to configure the Cisco ATA.
- Configuring the Cisco ATA Using a TFTP Server, page 3-7—This section describes procedures for configuring the Cisco ATA by using a Cisco CallManager TFTP server, which is the recommended configuration method for the deployment of a large number of Cisco ATAs.
- Voice Configuration Menu, page 3-18—This section includes information on how to obtain basic network connectivity for the Cisco ATA and how to perform a factory reset if necessary.

- Cisco ATA Web Configuration Page, page 3-21—This section shows the Cisco ATA Web configuration page and contains a procedure for how to configure Cisco ATA parameters using this interface.
- Resetting the Cisco ATA Using Cisco CallManager, page 3-23—This section gives the procedure (via the Cisco CallManager administration web pages) for resetting the Cisco ATA so that your configuration changes take effect.
- Upgrading the SCCP Signaling Image, page 3-24—This section provides references to the various means of upgrading your Cisco ATA signaling image.

Note The term *Cisco ATA* is used throughout this manual to refer to both the Cisco ATA 186 and the Cisco ATA 188, unless differences between the Cisco ATA 186 and Cisco ATA 188 are explicitly stated.

Default Boot Load Behavior

Before configuring the Cisco ATA, you need to know how the default Cisco ATA boot load process works. Once you understand this process, you will be able to configure the Cisco ATA by following the instructions provided in this section and in the sections that follow.

All Cisco ATAs are shipped with a boot load signaling-protocol image. However, because this image is not a fully functional Cisco ATA image, the Cisco ATA seeks to obtain the image-load information from the Cisco CallManager and perform a software upgrade. In addition, the Cisco ATA obtains the necessary SCCP-specific configuration files for Cisco CallManager communication and the Cisco ATA configuration file during the boot load process.

The following list summarizes the default Cisco ATA behavior during its boot-up process:

1. The Cisco ATA uses the Cisco Discovery Protocol (CDP) to discover which VLAN to enter. If the Cisco ATA receives a VLAN ID response from the network switch, the Cisco ATA enters that VLAN and adds 802.1Q VLAN tags to its IP packets. If the Cisco ATA does not receive a response with a VLAN ID from the network switch, then the Cisco ATA assumes it is not operating in a VLAN environment and does not perform VLAN tagging on its packets.

Note If your network environment is not set up to handle this default behavior, make the necessary configuration changes by referring to the "Specifying a Preconfigured VLAN ID or Disabling VLAN IP Encapsulation" section on page 3-3.

2. The Cisco ATA contacts the DHCP server to request its own IP address.

Note If your network environment does not contain a DHCP server, you need to statically configure various IP addresses so that the Cisco ATA can obtain network connectivity. For a list of parameters that you must configure to obtain network connectivity, see Table 3-6 on page 3-19. For instructions on how to use the voice configuration menu, which you must use to perform this configuration, see the "Voice Configuration Menu" section on page 3-18.

3. Also from the DHCP server, the Cisco ATA requests the IP address of the Cisco CallManager TFTP server.

4. The Cisco ATA contacts the Cisco CallManager TFTP server and downloads the appropriate .xml or .cnf configuration file that allows the Cisco ATA to communicate with the correct Cisco CallManager.
5. The .xml or .cnf file that the Cisco ATA downloads includes information about which signaling image the Cisco ATA needs to function properly. The Cisco ATA finds that image on the TFTP server and automatically downloads this image along with the corresponding version of Cisco ATA release software.

Note If you are not using a Cisco CallManager TFTP server, you need to manually upgrade the Cisco ATA to the correct signaling image. For information on this procedure, see the "Upgrading the Signaling Image Manually" section on page 7-4.

6. The Cisco ATA looks for a Cisco ATA-specific configuration file (designated by the MAC address of the Cisco ATA and named ata<*macaddress*>) on the TFTP server and downloads this file if it exists.
7. If the Cisco ATA does not find the MAC-address configuration file, it looks for the atadefault.cfg configuration file and downloads this file if it exists. This file can contain default values for the Cisco ATA to use.

Note When the Cisco ATA is downloading its DHCP configuration, the function button on the top panel blinks.

Specifying a Preconfigured VLAN ID or Disabling VLAN IP Encapsulation

If you want the Cisco ATA to use a preconfigured VLAN ID instead of using the Cisco Discovery Protocol to locate a VLAN, or if you want to disable VLAN IP encapsulation, refer to Table 3-1 for a reference to the parameters and bits you may need to configure. Use the voice configuration menu to configure these parameters. (See the "Voice Configuration Menu" section on page 3-18 for instructions on using this menu.) Also, refer to Table 3-2 for a matrix that indicates which VLAN-related parameters and bits to configure depending on your network environment.

Table 3-1 Parameters and Bits for Preconfiguring a VLAN ID

Parameter and Bits	Reference
OpFlags: • Bit 4—Enable the use of user-specified voice VLAN ID. • Bit 5—Disable VLAN encapsulation • Bit 6—Disable CDP discovery.	OpFlags, page 5-17
VLANSetting: • Bits 0-2—Specify VLAN CoS bit value (802.1P priority) for TCP packets. • Bits 3-5—Specify VLAN CoS bit value (802.1P priority) for UDP packets • Bits 18-29—User-specified 802.1Q VLAN ID	VLANSetting, page 5-18

Table 3-2 VLAN-Related Features and Corresponding Configuration Parameters

Feature	OpFlags Bit 4	OpFlags Bit 5	OpFlags Bit 6	VLANSetting Bits 18-29
Static VLAN	1	0	1	VLAN ID
CDP-acquired VLAN	0	0	0	N/A
No VLAN	N/A	1	N/A	N/A
No CDP	N/A	N/A	1	N/A
No CDP and no VLAN	0	1	1	N/A

N/A indicates that the variable is not applicable to the feature and the setting of this varaible does not affect the feature.

Example

The following procedure shows you how to configure the OpFlags and VLANSetting parameters to allow the Cisco ATA to use a user-specified VLAN ID. In this example, the voice VLAN ID is 115 (in decimal format).

Step 1 Set bits 4-6 of the OpFlags parameter to 1, 0, and 1, respectively. This setting translates to the following bitmap:

```
xxxx xxxx xxxx xxxx xxxx xxxx x101 xxxx
```

The remaining bits of the OpFlags parameter, using all default values, make up the following bitmap representation:

```
0000 0000 0000 0000 0000 0000 0xxx 0010
```

Therefore, the resulting value of the OpFlags parameter becomes the following bitmap representation:

```
0000 0000 0000 0000 0000 0000 0101 0010
```

In hexadecimal format, this value is 0x00000052.

Step 2 Set bits 18-29 of the VLANSetting parameter to to voice VLAN ID 115. This setting translates to the following bitmap

```
xx00 0001 1100 11xx xxxx xxxx xxxx xxxx
```

where 000001110011 is the binary representation of the demical value 115.

The remaining bits of the VLANSetting parameter, using all default values, make up the following representation:

```
00xx xxxx xxxx xx00 0000 0000 0010 1011
```

Therefore, the resulting value of the VLANSetting parameter becomes the following bitmap representation:

```
0000 0001 1100 1100 0000 0000 0010 1011
```

In hexadecimal format, this value is 0x01cc002b.

Note If you are using the voice configuration menu to set the parameters, you must convert hexadecimal values to decimal values. For example, the OpFlags setting of 0x00000052 is equivalent to 82 in decimal format, and the VLANSetting of 0x01cc002b is equivalent to 30146603 in decimal format.

Steps Needed to Configure the Cisco ATA

This section contains the following topics:

- Basic Configuration Steps in a Cisco CallManager TFTP Server Environment, page 3-6
- Basic Configuration Steps in a Non-TFTP Server Environment, page 3-7

Basic Configuration Steps in a Cisco CallManager TFTP Server Environment

Table 3-3 shows the basic steps for configuring the Cisco ATA and making it operational in a typical SCCP environment, which includes a Cisco CallManager TFTP server.

Table 3-3 Basic Steps to Configure the Cisco ATA in a Typical Cisco CallManager Environment

Action	Reference
1. Download the desired Cisco ATA release software zip file from the Cisco web site and store it on the Cisco CallManager TFTP server.	Setting Up the TFTP Server with Cisco ATA Software, page 3-8
2. Create a default configuration file that can be used by many Cisco ATAs in your Cisco CallManager environment. **Note** You can skip this step if the Cisco ATA default parameters do not require re-configuration in your network environment.	Creating a Cisco ATA Default Configuration File, page 3-10
3. Configure the method with which the Cisco ATA will locate the Cisco CallManager TFTP server at boot up time.	Configuring the Cisco ATA to Obtain its Configuration File from the TFTP Server, page 3-15
4. Add the Cisco ATA to the Cisco CallManager.	Chapter 4, “Adding the Cisco ATA to the Cisco CallManager”
5. Power up the Cisco ATA.	
6. Optionally, create a configuration file for a specific Cisco ATA.	Creating a Configuration File for a Specific Cisco ATA, page 3-12
7. If you make configuration changes to the Cisco ATA, you must reset the Cisco ATA by using the Cisco CallManager administration web pages.	Resetting the Cisco ATA Using Cisco CallManager, page 3-23

Basic Configuration Steps in a Non-TFTP Server Environment

Table 3-4 shows the basic steps for configuring the Cisco ATA without using the TFTP server method.

Table 3-4 Basic Steps to Configure the Cisco ATA Without Using the TFTP Server Method

Action	Reference
1. Download the desired Cisco ATA release software zip file from the Cisco web site: a. If you are a registered CCO user. go to the following URL: http://www.cisco.com/cgi-bin/tablebuild.pl/ata186 b. Download the zip file that contains the software for the applicable release and signaling image you are using. The contents of each file are described next to the file name. c. Extract the files to the desired location on your PC. **Note** The file that contains the protocol signaling image has an extension of .zup.	
2. Manually upgrade the Cisco ATA to the correct signaling image.	Upgrading the Signaling Image Manually, page 7-4
3. Configure the Cisco ATA by using either one of the manual-configuration methods.	• Voice Configuration Menu, page 3-18 • Cisco ATA Web Configuration Page, page 3-21
4. Manually configure the CA0orCM0 parameter to instruct the Cisco ATA about how to register with Cisco CallManager.	CA0orCM0 and CA1orCM1, page 5-9
5. Power up the Cisco ATA.	

Configuring the Cisco ATA Using a TFTP Server

The TFTP method of configuration is useful when you have many Cisco ATA because you can use a TFTP server for remote, batch configuration of Cisco ATAs. A TFTP server can host one unique configuration file for each Cisco ATA.

This section contains the following topics:

- Setting Up the TFTP Server with Cisco ATA Software, page 3-8
- Configurable Features and Related Parameters, page 3-8
- Parameters Not Used for SCCP, page 3-10
- Creating a Cisco ATA Default Configuration File, page 3-10
- Creating a Configuration File for a Specific Cisco ATA, page 3-12
- Configuring the Cisco ATA to Obtain its Configuration File from the TFTP Server, page 3-15

Setting Up the TFTP Server with Cisco ATA Software

This section provides the procedure for the Cisco ATA administrator to obtain the correct Cisco ATA software and set up the Cisco CallManager TFTP server with this software.

Procedure

Step 1 If you are a registered CCO user. go to the following URL:
http://www.cisco.com/cgi-bin/tablebuild.pl/ata186

Step 2 Download the zip file that contains the software for the applicable release and signaling image you are using. The contents of each file are described next to the file name. Save the zip file onto a floppy disc.

Note The file that contains the protocol signaling image has an extension of .zup.

Step 3 Insert the floppy disc into the Cisco CallManager disc drive.

Step 4 From your computer, navigate to **Start > Programs > Terminal Services > Client**. The Terminal Services Client screen appears.

Step 5 In the Services field of the Terminal Services Client screen, enter the IP address of the Cisco CallManager that contains the disc you inserted. Then, click the **Connect** button. The Login screen appears.

Step 6 Enter your login information, then click **OK**. The TFTP Path screen appears.

Step 7 Click on the **My Computer** icon that is located within the Terminal Services Client screen, then navigate to the **A:** drive.

Step 8 From the **A:** drive, drag the zip file to the TFTP Path screen. This will extract all the files and place them onto the Cisco CallManager TFTP server.

Configurable Features and Related Parameters

Table 3-5 lists, in alphabetical order, various features that you can configure for the Cisco ATA. Table 3-5 also includes links to the related parameter that allows you to configure each of these features. Each link takes you to a detailed description of the parameter that includes its default values.

For an example of how to configure parameters for the TFTP Server configuration method, see the "Creating a Cisco ATA Default Configuration File" section on page 3-10.

Table 3-5 Configurable Features and Related Parameters

Configurable Features	Related Parameters
Audio Media Features	Audio Media Parameters
• Low bit-rate codec selection (G.723.1, G.729)	• LBRCodec, page 5-11
• Silence suppression	• AudioMode, page 5-12
• RTP media port configuration	• MediaPort, page 5-27
Caller ID format	CallerIdMethod, page 5-14
Debug and Diagnosis	NPrintf, page 5-26, TraceFlags, page 5-27

Table 3-5 Configurable Features and Related Parameters (continued)

Configurable Features	Related Parameters
Fax Services Features • Fax services mode selection • Named Signalling Event (NSE) payload type for fax pass-through	Fax Services Parameters • AudioMode, page 5-12, ConnectMode, page 5-13 • ConnectMode, page 5-13
Hook-flash detection timing configuration	SigTimer, page 5-19
Mid-call service format—Bellcore, Cisco VG248 or Cisco ATA	ConnectMode, page 5-13
Network-related Features • Cisco Discovery Protocol (CDP)—on/off • DHCP configuration • DNS configuration • Static IP configuration • VLAN configuration	Network-related Parameters • OpFlags, page 5-17 • DHCP, page 5-6, OpFlags, page 5-17 • DNS1IP, page 5-15, DNS2IP, page 5-16 • StaticIp, page 5-7, StaticRoute, page 5-7, StaticNetMask, page 5-8 • OpFlags, page 5-17, VLANSetting, page 5-18
SCCP Terminal-related Features • Cisco CallManager 3.0 support • Cisco IOS Telephony Solution (ITS) support • Domain name in Cisco CallManager environment • SCCP/MGCP protocol selection • Static Cisco CallManager configuration • Terminal FXS lines	SCCP Terminal-related Parameters • ConnectMode, page 5-13 • ConnectMode, page 5-13 • Domain, page 5-16 • UseMGCP, page 5-10 • CA0orCM0 and CA1orCM1, page 5-9 • EPID0orSID0 and EPID1orSID1, page 5-8
User Interface and TFTP Features • User interface password • TFTP Configuration • TFTP Encryption key • Web configuration—enable/disable	User Interface and TFTP Parameters • UIPassword, page 5-3 • UseTFTP, page 5-4, TftpURL, page 5-4, OpFlags, page 5-17 • EncryptKey, page 5-5 • OpFlags, page 5-17
Packet Precedence Features • UDP Type of Service (ToS) configuration • 802.1P Class of Service (Cos) Bit configuration	Packet Precedence Parameters • UDPTOS, page 5-17 • VLANSetting, page 5-18
Ring-cadence format	RingCadence, page 5-20
Tone format: BusyTone, CallWaitTone ConfirmTone, DialTone, ReorderTone, and RingBackTone parameters	Call-Progress Tone Parameters, page 5-21

Parameters Not Used for SCCP

The following parameters appear on the Cisco ATA Web configuration screen but are used only for the MGCP image and not for SCCP:

- CA0UID
- CA1UID
- CfgInterval
- CodecName
- MGCPPort
- MGCPVer
- NumTxFrames
- PrefCodec
- RetxIntvl
- TetxLim
- ToConfig

Creating a Cisco ATA Default Configuration File

The Cisco ATA release-software zip files includes a file called atadefault.cfg, which is a binary file that contains all the default parameters for the Cisco ATA. However, you likely will need to create your own atadefault.cfg file to contain the default settings that you want Cisco ATAs in your environment to use. For information on each configuration parameter, including all default values, see Chapter 5, "Parameters and Defaults."

Use the text file called sk_example.txt as a basis for creating your default file. The sk_example.txt file is included in the software-release zip file and contains all default values. This file is shown without its annotations in the "Configuration Text File Template" section on page 5-2.

The following procedure illustrates how to create the Cisco ATA default configuration file, convert it to the required binary format that the Cisco ATA can read, and store it on the TFTP server so that the Cisco ATA will download it during the boot-up process:

Procedure

Step 1 Make a copy of the sk_example.txt file and rename it atadefault.txt.

Step 2 Make the desired configuration changes by editing the atadefault.txt file, then save the file.

Step 3 Convert the atadefault.txt file to a binary file by running the cfgfmt.exe tool, which is bundled with the Cisco ATA software.

Note Be sure to name the output file atadefault.cfg.

If you wish to encrypt the binary file for security reasons, see the "Using the EncryptKey Parameter and cfgfmt Tool" section on page 3-14.

The syntax of the cfgfmt program follows:

Syntax

cfgfmt [-eRC4Password] -tpTagFile input-text-file output-binary-file

- -eRC4Password is the optional RC 4key to encrypt the binary TFTP file provided by the cfgfmt program (up to eight alphanumeric characters).
- pTagFile is the command used to specify the *ptag*.dat file that is provided with the Cisco ATA software version you are running. Search on the keyword *ptag* to find the complete name of the *ptag* file that is included with the Cisco ATA software for the signaling protocol you are using. Be sure this file resides in the same directory from which you are running the cfgfmt program. The *ptag*.dat file is used by cfgfmt.exe to format a text input representation of the parameter/value pairs to its output binary representation.
- input-text-file is the input text file representation of the Cisco ATA configuration file.
- output-binary-file is the final output binary file that Cisco ATA uses as the TFTP configuration file.

Example

cfgfmt -tmgcp_ptag.dat atadefault.txt ***atadefault.cfg***

Step 4 Store the binary configuration file in the TFTP server root directory, overwriting the atadefault.cfg file that came bundled with the release-software download.

During the boot-up process, the Cisco ATA will download this file as its configuration file unless it first finds a Cisco ATA-specific configuration file named for the MAC address of the Cisco ATA. (If you want to create a MAC-address configuration file for a specific Cisco ATA, see the "Creating a Configuration File for a Specific Cisco ATA" section on page 3-12.)

Note If you want to make configuration changes after boot up, repeat the process of creating or editing the text file containing the desired parameters, then converting the text file to the binary file and storing the binary file on the TFTP server. For the configuration changes to take effect, reset the Cisco ATA. (See the "Resetting the Cisco ATA Using Cisco CallManager" section on page 3-23.)

Creating a Configuration File for a Specific Cisco ATA

Once you have booted up the Cisco ATA, you may decide that you want to create a configuration file that is specific to one Cisco ATA.

The following procedure illustrates how to create a Cisco ATA-specific configuration file, convert it to the required binary format that the Cisco ATA can read, and store it on the TFTP server so that the Cisco ATA will download it as soon as you reset the Cisco ATA.

Procedure

Step 1 Open the atadefault.txt file that you created when you developed your own default file. Find the parameters whose values you want to change for this specific Cisco ATA. Copy only these parameters into a new text file. Save the new text file with the following name:

ata<*macaddress*>.txt

where *macaddress* is the non-dotted hexadecimal version of the MAC address of the Cisco ATA you are configuring. This non-dotted hexadecimal MAC address is labeled on the bottom of most Cisco ATAs next to the word "MAC." The file name must be exactly 15 characters long. (However, if this filename is supplied by the DHCP server, the name can be as long as 31 characters and can be any name with printable ASCII characters.)

If necessary, you can obtain the non-dotted hexadecimal MAC address by using the atapname.exe command. For information on using the atapname.exe command, see the "Using atapname.exe Tool to Obtain MAC Address" section on page 3-13. That section includes an example of a dotted decimal MAC address and its corresponding non-dotted hexadecimal address.

Note The ata<*macaddress*>.txt file should contain only those parameters whose values you are changing from their defaults. Parameter values in the ata<*macaddress*> configuration file will overwrite any manually configured values (values configured through the web or voice configuration menu) when the Cisco ATA powers up or resets.

Example

You might want to change the values of the following parameters, whose default values are shown first:

```
LBRCodec:3
AudioMode:0x00350035
```

You could change the values as follows:

```
LBRCodec:0
AudioMode:0x00350034
```

Step 2 Save your changes.

Step 3 Run the cfgfmt.exe tool, which is bundled with the Cisco ATA software, on the ata<*macaddress*>.txt text file to generate the binary configuration file. If you wish to encrypt the binary file for security reasons, see the "Using the EncryptKey Parameter and cfgfmt Tool" section on page 3-14.

The syntax of the cfgfmt program follows:

Syntax

`cfgfmt` `[-eRC4Password] -tpTagFile input-text-file output-binary-file`

- `-eRC4Password` is the optional RC 4key to encrypt the binary TFTP file provided by the cfgfmt program (up to eight alphanumeric characters).
- `pTagFile` is the command used to specify the *ptag*.dat file that is provided with the Cisco ATA software version you are running. Search on the keyword *ptag* to find the complete name of the *ptag* file that is included with the Cisco ATA software for the signaling protocol you are using. Be sure this file resides in the same directory from which you are running the cfgfmt program. The *ptag*.dat file is used by cfgfmt.exe to format a text input representation of the parameter/value pairs to its output binary representation.
- `input-text-file` is the input text file representation of the Cisco ATA configuration file.
- `output-binary-file` is the final output binary file that Cisco ATA uses as the TFTP configuration file.

Example

`cfgfmt -tmgcp_ptag.dat ata0a141e28323c.txt` ***`ata0a141e28323c`***

This example is based on a Cisco ATA MAC address of 10.20.30.40.50.60, which converts to the two-digit, lower-case hexadecimal representation of each integer as 0a141e28323c.

Step 4 Store the binary configuration file in the TFTP server root directory.

Step 5 Reset the Cisco ATA using the Cisco CallManager. (See the "Resetting the Cisco ATA Using Cisco CallManager" section on page 3-23.)

After being reset, the Cisco ATA will download this ata<*macaddress*> binary configuration file as its unique configuration file. This file takes precedence over the atadefault.cfg file. If the Cisco ATA finds an ata<*macaddress*> file on the TFTP server, the Cisco ATA does not look for the atadefault.cfg file.

Using atapname.exe Tool to Obtain MAC Address

This bundled tool is useful for converting the dotted decimal version of the Cisco ATA MAC address (available on the Cisco ATA Web configuration page or from the voice configuration menu code **24#**) to its default Cisco ATA profile name. This name has the following format:

`ata`*`xxxxxxxxxxxx`*

where each *xx* is the two-digit, lower-case hexadecimal representation of each integer in the dotted, decimal version of the Cisco ATA MAC address. This is the name you use for the unique Cisco ATA binary configuration file.

The following command and output show an example of this command.

Command Example

```
atapname.exe 10.20.30.40.50.60
```

Command Output

```
ata0a141e28323c
```

Note The same functionality is available from the voice configuration menu (voice menu code **84#)**, which will announce the Cisco ATA profile name.

Using the EncryptKey Parameter and cfgfmt Tool

The EncryptKey parameter encrypts binary files being transferred over a TFTP server. You can make this parameter unique for each Cisco ATA.

By default, the Cisco ATA-specific ata<*macaddress*> configuration file is not encrypted. If encryption of is required, however, you must manually configure the EncryptKey parameter before you boot up the Cisco ATA so that the TFTP method is secure. Use either the voice configuration menu (see the "Voice Configuration Menu" section on page 3-18) or the Cisco ATA web configuration page (see the "Cisco ATA Web Configuration Page" section on page 3-21) to configure the EncryptKey parameter.

Note Because the factory-fresh Cisco ATA cannot accept encrypted configuration files, the first unencrypted file, if intercepted, can easily be read. (You would still have to know the data structure format in order to decode the binary information from the unencrypted file.) Therefore, the new encryption key in the unencrypted file can be compromised.

Set the EncryptKey parameter to a nonzero value. When this value is nonzero, the Cisco ATA assumes that the binary configuration file on the TFTP server is to be encrypted with this key by means of the RC4 cipher algorithm. The Cisco ATA will use this key to decrypt the configuration file.

The Cisco ATA EncryptKey parameter and the encryption key used in the cfgfmt tool command syntax must match.

Note For security reasons, Cisco recommends that you set the UIPassword parameter (if desired) in the configuration file and not by using one of the manual configuration methods.

The cfgfmt.exe syntax affects how the EncryptKey parameter is used, as shown in the following examples. In these examples, input_text is the ata<*macaddress*>.txt file that you will convert to binary to create an ata<*macaddress*>configuration file for the Cisco ATA; output_binary is that binary ata<*macaddress*> file, and *Secret* is the encryption key.

Syntax examples

- `cfgfmt -tpTagFile input-text-file output-binary-file`

  If input-text-file sets the Cisco ATA EncryptKey parameter to 0, then output-binary-file is not encrypted. If the input-text-file sets EncryptKey to a non-zero value, then output-binary-file is encrypted with that value.

- `cfgfmt -eSecret -tpTagFile input-text-file output-binary-file`

  If the Cisco ATA EncryptKey parameter has the value of 0 or is not included in input-text-file, the *Secret* is used to encrypt the output-binary-file. If input-text-file sets the Cisco ATA EncryptKey parameter to a nonzero value and the -e option is used, then output-binary-file is encrypted with the EncryptKey parameter set in input-text-file and *Secret* is ignored.

- `cfgfmt -E -tpTagFile input-text-file output-binary-file`

  The -E (uppercase) option means that any value specified for the Cisco ATA EncryptKey parameter in input-text-file is ignored. However, because *Secret* is not specified in this example, output-binary-file is not encrypted. Nevertheless, the EncryptKey parameter and its value, if specified in input-file-text, will be included in output-binary-file for possible encryption at a later time.

- `cfgfmt -E -eSecret -tpTagFile input-text-file output-binary-file`

  The -E (uppercase) option means that any value specified for the Cisco ATA EncryptKey parameter in input-text-file is ignored and the output-binary-file is encrypted with the *Secret* key. However, the EncryptKey parameter and its value, if specified in input-text-file, will be included in output-binary-file.

Configuring the Cisco ATA to Obtain its Configuration File from the TFTP Server

This section describes three methods from which to choose how the Cisco ATA contacts the TFTP server to obtain its configuration file:

- Using a DHCP Server, page 3-15
  - The Cisco ATA contacts the DHCP server, which provides the IP address of the TFTP server
  - The Cisco ATA uses the DHCP server but the DHCP server does not know about TFTP server
- Without Using a DHCP Server, page 3-17

Note In the rare instance where no TFTP server is used, you must manually configure the CA0orCM0 parameter to instruct the Cisco ATA about how to register with Cisco CallManager. For this scenario, see the "CA0orCM0 and CA1orCM1" section on page 5-9.

Using a DHCP Server

When using a DHCP server, configuration settings vary depending on whether or not the DHCP server is under the control of the Cisco ATA system administrator or the service provider. The simplest configuration is when the DHCP server is under the control of the Cisco ATA administrator, in which case the DHCP server provides the IP address of the TFTP server. Depending on who controls the DHCP server, follow the applicable configuration procedure:

- Procedure if DHCP Server is Under Control of Cisco ATA Administrator, page 3-16
- Procedure if DHCP Server is not Under Control of Cisco ATA Administrator, page 3-16

This section also includes the topic:

- Other DHCP Options You Can Set, page 3-17

Note If no DHCP server is found and the Cisco ATA is programmed to find one, the function button continues to blink.

Procedure if DHCP Server is Under Control of Cisco ATA Administrator

Procedure

Step 1 On the DHCP server, set one of the following two options:

- DHCP option 150 (TFTP server IP address)
- Standard DHCP option 66 (TFTP server name)

If you use DHCP option 150, the Cisco ATA will ignore DHCP option 66. However, if you use DHCP option 66, you must turn off DHCP option 150 or set its value to 0.

Note You can turn off the DHCP option 150 request by using the Cisco ATA OpFlags parameter (see the "OpFlags" section on page 5-17).

Step 2 Make sure to use default values for the following Cisco ATA parameters:

- TFTPUrl=0
- UseTFTP=1
- DHCP=1
- CA0orCM0=0

This completes the parameter settings and DHCP options you need to configure for this procedure. The Cisco ATA will contact the DHCP server for the IP address of the TFTP server that contains the Cisco ATA configuration file.

Procedure if DHCP Server is not Under Control of Cisco ATA Administrator

This is the procedure to use if the DHCP server is not under the control of the Cisco ATA administrator, which means that the URL of the TFTP server must be manually configured.

Procedure

Step 1 Using the voice configuration menu, set the parameter TftpURL to the IP address or URL of the TFTP server. For more information on setting the TftpURL parameter, see the "TftpURL" section on page 5-4. For information about using the Cisco ATA voice configuration menu, see the "Voice Configuration Menu" section on page 3-18.

Note If you are not using a DHCP server to provide the TFTP server location, you *must* manually configure the TftfURL. You can do this by using the voice configuration menu without first obtaining network connectivity for the Cisco ATA. If you want to configure this value using the Web configuration page, you first must obtain network connectivity by using the voice configuration menu to statically configure IP address information (see the "Voice Configuration Menu" section on page 3-18).

Step 2 Use the default value of 1 for the Cisco ATA parameter DHCP.

Step 3 Use the default value of 1 for the Cisco ATA parameter UseTftp.

Step 4 Use the default value of 0 for the Cisco ATA parameter CA0orCM0.

This completes the parameter settings you need to configure for this procedure. The Cisco ATA will contact the manually configured TFTP server that contains the Cisco ATA configuration file.

Other DHCP Options You Can Set

The following parameters can also be configured with DHCP:

- Boot file name of DHCP header—The ata<*macaddress*> binary Cisco ATA configuration file, which can have a maximum of 31 characters and can be any name with printable ASCII characters
- Client PC address
- DHCP option 1—Client Subnet Mask
- DHCP option 3—Routers on the client's subnet
- DHCP option 6—One or two Domain Name servers
- DHCP option 43—Set this option to identify the protocol (for example, **SCCP**)
- DHCP Option 60 (DHCP_VENDOR_CLASS_ID)—Use this parameter to identify the type of Cisco ATA box (**ATA186** or **ATA188**).

Without Using a DHCP Server

Use the following procedure if you are not using a DHCP server in your environment but are still using a TFTP server to obtain the Cisco ATA configuration file:

Procedure

Step 1 Set the DHCP parameter to 0.

Step 2 Set the UseTFTP parameter to 1.

Step 3 Set the Cisco ATA parameter TftpURL to the IP address or URL of the TFTP server. For more information on setting the TftpURL parameter, see the "TftpURL" section on page 5-4.

Note If you are not using a DHCP server to provide the TFTP server location, you must manually enter the TftpURL using either the voice configuration menu or the web configuration page.

Step 4 If you have done already done so, statically configure the following parameters using the voice configuration menu (see the "Voice Configuration Menu" section on page 3-18). These are the parameters you need to configure for the Cisco ATA to obtain network connectivity:

- StaticIP
- StaticRoute
- StaticNetMask

Other parameters that are normally supplied by DHCP may be provided statically by configuring their values. These parameters are:

- DNS1IP
- DNS2IP
- Domain

This completes the parameter settings you need to configure in order for the Cisco ATA to contact the TFTP server (without using DHCP) that will contain the configuration file for the Cisco ATA.

Voice Configuration Menu

The main reasons to use the voice configuration menu are to establish IP connectivity for the Cisco ATA if a DHCP server is not being used in your network environment, and to reset the Cisco ATA to its factory values if necessary. You can also use the voice configuration menu if you need to configure a small number of parameters or if the web interface and TFTP configuration are not available.

Note Do not use the voice configuration menu to attempt to change any values that you configured by means of the TFTP configuration file method. Whenever the Cisco ATA resets, it downloads its ata<*macaddress*> configuration file or atadefault.cfg default configuration file from the TFTP server, and the values in either of these files will overwrite the values of any corresponding parameters configured with the voice configuration menu.

See Chapter 5, "Parameters and Defaults," for a complete list of parameters and their definitions. Also see Table 3-5 on page 3-8 for an alphabetical listing of configurable features and references to their corresponding parameters.

This section contains the following topics:

- Using the Voice Configuration Menu, page 3-18
- Entering Alphanumeric Values, page 3-20
- Resetting the Cisco ATA to Factory Default Values, page 3-20

Using the Voice Configuration Menu

To manually configure the Cisco ATA by using the voice configuration menu and the telephone keypad, perform the following steps:

Procedure

Step 1 Connect an analog touch-tone phone to the port labeled **Phone 1** on the back of the Cisco ATA.

Step 2 Lift the handset and press the function button located on the top of the Cisco ATA. You should receive the initial voice configuration menu voice prompt.

Step 3 Using the telephone keypad, enter the voice menu code for the parameter that you want to configure or the command that you want to execute, then press **#**. For a list of voice menu codes, see Appendix B, "Voice Menu Codes."

Table 3-6 lists the menu options that you need to configure basic IP connectivity for the Cisco ATA, after which you can use the Cisco ATA web configuration page to configure additional parameters.

Note If you are using the voice configuration menu to statically configure the Cisco ATA IP address, you must disable DHCP by setting its value to 0.

Table 3-6 Parameters that Provide Basic IP Connectivity for the Cisco ATA

Voice Menu Number	Features
1	StaticIP—IP address of the Cisco ATA.
2	StaticRoute—Default gateway for the Cisco ATA to use.
10	StaticNetMask—Subnet mask of the Cisco ATA.
20	DHCP—Set value to 0 to disable the use of a DHCP server; set value to 1 to enable DHCP.
21	Review the IP address of the Cisco ATA.
22	Review the default router for the Cisco ATA to use.
23	Review subnet mask of the Cisco ATA.

Step 4 Follow the voice prompts and enter the appropriate values, then press the **#** key.

Note Use the * key to indicate a delimiter (dot). For example, to enter an IP address of 192.168.3.1, you would enter 192*168*3*1 on your telephone keypad.

Note When entering values for a field that contains a hexadecimal value, you must convert the hexadecimal value to a decimal value in order to enter it into the voice configuration menu system. For example, to enter the hexadecimal value 0x6A, you would enter the number 106 on the telephone keypad.

The voice configuration menu repeats the value you entered, then prompts you to press one of the following keys:

- 1=Change your entered value
- 2=Review your entered value
- 3=Save your entered value
- 4=Review the current saved value

Step 5 Press the # key after you have entered the desired key. If you do not press the # key, the system will automatically timeout after 10 seconds.

Step 6 Cisco strongly recommends that you set a password. Use the voice menu code 7387277 (SETPASS) to configure a password through the voice configuration menu, after which you are prompted for the password whenever you attempt to change a parameter value.

Step 7 After completing the configuration through the voice configuration menu, press the **#** key to exit.

Step 8 Hang up the telephone. The Cisco ATA configuration refreshes. The function button fast-blinks when the refresh is completed.

Entering Alphanumeric Values

Some voice configuration menu options require you to enter alphanumeric characters. Alphanumeric entry differs from numeric entry because you must press **#** after each character selected.

If you need to enter an alphanumeric value, the voice prompt tells you to enter an alphanumeric value; otherwise, enter a numeric value (0 to 9).

Table 3-7 lists the keys on a telephone keypad and their respective alphanumeric characters.

Using Table 3-7 as a guide, enter the appropriate number key on the telephone keypad as many times as needed to select the number, letter, or symbol required. For example, to enter 58sQ, you would enter:

```
5 # 8 # 7 7 7 7 7 # 7 7 7 7 7 7 7 # #
```

Table 3-7 Alphanumeric Characters

Key	Alphanumeric Characters
1	1 ./_\ @*space return +-!,?|~^#=$”‘’%<>[] :;{}()&
2	2 a b c A B C
3	3 d e f D E F
4	4 g h i G H I
5	5 j k l J K L
6	6 m n o M N O
7	7 p q r s P Q R S
8	8 t u v T U V
9	9 w x y z W X Y Z
0	0

Resetting the Cisco ATA to Factory Default Values

It is possible that you may, under some circumstances, want to reset the Cisco ATA to its factory default values. For example, this is the only way to recover a forgotten password without contacting your Cisco representative.

To perform a factory reset, you must use the voice configuration menu and follow these steps:

Procedure

Step 1 Press the function button on the Cisco ATA.

Step 2 Press the digits **322873738** (**FACTRESET**) then press **#** on the telephone keypad.

Step 3 Press **3** on your telephone keypad to confirm that you want to reset the Cisco ATA, then hang up the phone.

Cisco ATA Web Configuration Page

You can use the Cisco ATA web configuration page in a non-TFTP configuration environment, or in a TFTP configuration environment as a read-only record of individual customer parameters.

Figure 3-1 shows an example of the Cisco ATA web configuration page, which displays all configurable parameters. The different colors on the screen are for different parameter groupings, as described in Chapter 5, "Parameters and Defaults."

Note Do not use the web configuration page to attempt to change any values that you configured by means of the TFTP configuration file method. Whenever the Cisco ATA resets, it downloads its ata<*macaddress*> configuration file or atadefault.cfg default configuration file from the TFTP server, and the values in either of these files will overwrite the values of any corresponding parameters configured with the Web configuration method.

Figure 3-1 Cisco ATA Web Configuration Page

UIPassword:	*	ToConfig:	0
UseTftp:	0	TftpURL:	0
CfgInterval:	3600	EncryptKey:	*
Dhcp:	0	StaticIP:	192.168.2.44
StaticRoute:	192.168.2.54	StaticNetMask:	255.255.254.0
EPID0orSID0:	a001	EPID1orSID1:	a002
CA0orCM0:	192.168.2.64	CA1orCM1:	0
CA0UID:	0	CA1UID:	0
UseMGCP:	1	MGCPVer:	MGCP1.0
RetxIntvl:	250	RetxLim:	3
MGCPPort:	2427	CodecName:	PCMU,PCMA,G723,G729
LBRCodec:	3	PrfCodec:	2
AudioMode:	0x00150015	ConnectMode:	0x00060400
CallerIdMethod:	0xc0019e60	DNS1IP:	0.0.0.0
DNS2IP:	0.0.0.0	Domain:	.
NumTxFrames:	2	UDPTOS:	0x000000a0
OpFlags:	0x00000002	VLANSetting:	0x0000002b
SigTimer:	0x00000064	RingCadence:	2,4,25
DialTone:	2,31538,30831,3100,38	BusyTone:	2,30467,28959,1191,1
ReorderTone:	2,30467,28959,1191,15	RingBackTone:	2,30831,30467,1943,2
CallWaitTone:	1,30831,0,5493,0,0,240	ConfirmTone:	1,30467,0,5970,0,0,4
NPrintf:	192.168.2.159.1011	TraceFlags:	0x00000001
MediaPort:	16384		

85760

You can access the web configuration page from any graphics-capable browser, such as Microsoft Internet Explorer or Netscape. This provides easy initial access to the Cisco ATA configuration within the administrator's private network.

Follow these steps to set parameters using the web configuration page:

Procedure

Step 1 Make sure that your PC and the Cisco ATA are already networked and visible to each another.

Step 2 Open your web browser.

Step 3 Enter the URL for your configuration page. The default URL for the web server is:

http://IP Address/**dev**

For example, the configuration page for a Cisco ATA with the IP address 192.168.3.225 is:

`http://192.168.3.225/dev`

Step 4 Select the values for the items that you want to configure. See Chapter 5, "Parameters and Defaults," for a complete list of parameters and their definitions. Also see Table 3-5 on page 3-8 for an alphabetical listing of configurable features and references to their corresponding parameters.

Note Cisco strongly recommends that you set a password. Use the UIPassword parameter to configure a password, after which you are prompted for the password whenever you attempt to change a parameter value. Configuration parameters cannot be accessed through the voice configuration menu if the password contains one or more letters and can be changed only by using the web interface or the TFTP configuration method.

Step 5 Click **apply** to save your changes.

The Cisco ATA automatically refreshes its configuration.

Step 6 Close your web browser.

Resetting the Cisco ATA Using Cisco CallManager

Whenever you make configuration changes to the Cisco ATA, you must reset the Cisco ATA using the Cisco CallManager for these configuration changes to take effect. To reset the Cisco ATA, use the following procedure:

Procedure

Step 1 Go to the main Cisco CallManager Administration screen.

Step 2 Using voice configuration menu code 21, review the Cisco ATA IP address.

Step 3 From the Device pull-down menu, select **Phone**. The Find and List Phones screen appears.

Step 4 In the area next to the Find button, enter a portion or all of the Cisco ATA MAC address, then press **Find**. The Find and List Phones screen reappears, and now contains the Cisco ATAs that match the *find* criteria you entered in the previous screen.

Step 5 Click the icon of the Cisco ATA that you would like to reset. The Phone Configuration screen appears.

Step 6 Click the **Reset Phone** button on the Phone Configuration screen. The Reset Device pop-up window appears.

Step 7 Click **Reset**.

Step 8 A confirmation box appears. Click **OK**.

Upgrading the SCCP Signaling Image

For instructions on how to upgrade the Cisco ATA to the most recent SCCP signaling image, refer to the following list:

- To use the recommended Cisco CallManager TFTP method of upgrading any or all Cisco ATAs at one time, see the "Upgrading the Signaling Image Via Cisco CallManager" section on page 7-2.
- In the rare instance that you are not using the Cisco CallManager TFTP to configure the Cisco ATA and to obtain software upgrades, you must manually upgrade to the latest signaling image immediately after the Cisco ATA boots up. In this case, see the "Upgrading the Signaling Image Manually" section on page 7-4.

CHAPTER 4

Adding the Cisco ATA to the Cisco CallManager

Once you have configured the Cisco ATA, converted the configuration file into a binary file and stored the file on the Cisco CallManager TFTP server, you must register the Cisco ATA with Cisco CallManager.

The Cisco CallManager administrator must decide which of the three registration methods is best based on the Cisco CallManager environment.

- Adding Cisco ATAs Manually, page 4-2—You can use this method if you have a limited number of Cisco ATAs to add to the Cisco CallManager.
- Using the Cisco Bulk Administration Tool (BAT), page 4-3—This is the most common method if you need to add many Cisco ATAs to the Cisco CallManager.
- Using Auto-Registration, page 4-4—This method is disabled by default. If this method is enabled, all devices connected to a specific Cisco CallManager are auto-registered. This process cannot be limited to only the Cisco ATAs that are connected to a specific Cisco CallManager.

For Cisco CallManager 3.2 or later, register the Cisco ATA as the **Cisco ATA 186** device type (regardless of whether the device is a Cisco ATA 186 or a Cisco ATA 188). If you are using a version of Cisco CallManager prior to Release 3.2, you must register the Cisco ATA as the **Cisco 7960** device type.

Note The term *Cisco ATA* is used throughout this manual to refer to both the Cisco ATA 186 and the Cisco ATA 188, unless differences between the Cisco ATA 186 and Cisco ATA 188 are explicitly stated.

Adding Cisco ATAs Manually

Use the following procedure to add Cisco ATAs manually using the Cisco CallManager Administration application.

Tip To get help using the Cisco CallManager application, access context-sensitive help by choosing **Help > For this page** from the main menu bar.

Procedure

Step 1 Log in to the Cisco CallManager Administration application.

From the menu bar, select **System > Cisco CallManager**. The Cisco CallManager Configuration screen appears.

Step 2 In the Cisco CallManager Configuration screen, perform the following steps:

a. From the list of Cisco CallManagers click the IP address or name of the Cisco CallManager to configure.

b. Enter identical Starting Directory Number and Ending Directory Number values in the fields provided.

c. Make sure that the setting called **Auto-registration Disabled on this Cisco CallManager** is checked.

d. Click the **Update** button.

Step 3 From the Cisco CallManager Administration menu bar, select **Device > Phone** to display the Find and List Phones screen.

Step 4 Click the **Add a New Phone** link to display the Add a New Phone screen.

Step 5 From the Phone Type drop-down list, make your selection as follows:

a. If you are using Cisco CallManager version 3.0 or 3.1, select **Cisco 7960**.

b. If you are using Cisco CallManager version 3.2, select **Cisco ATA 186**.

Step 6 Click **Next**. The Phone Configuration screen appears.

Step 7 In the Phone Configuration screen, you must enter information in the following fields:

- MAC Address —Enter the MAC address of the Cisco ATA.
- Device Pool—Select either the **Default** value or a configured device pool from the drop-down list.
- Phone Button Template—From the drop-down list, select **Standard 7960** if you are using Cisco CallManager version 3.0 or 3.1; select **Standard ATA 186** if you are using Cisco CallManager version 3.2

Step 8 Click the **Insert** button (called the **Update** button in Cisco CallManager version 3.2).

The Cisco CallManager Administration application should inform you that the device has been added to the database. You are also asked if you want to assign a directory number for the **Phone 1** port at this time.

Click **OK**.

Step 9 In the Directory Number field, assign a directory number to the Cisco ATA.

Step 10 From the Partition drop-down list, you can select a partition for the Cisco ATA or you can keep the default value of **None**.

Step 11 Click the **Insert** button (called the **Update** button in Cisco CallManager version 3.2).

A popup window asks you if you want to return to the current-device page. Click **OK**.

Step 12 To add a second FXS port to Cisco CallManager, go back to Step 3 and proceed from there.

You need to fabricate a MAC address for the **Phone 2** port by dropping the two left-most digits from the Cisco ATA MAC address and add the digits **01** to the right-most portion of the MAC address.

Example

If the MAC address of the Cisco ATA is *00070EA26032*, then the fabricated MAC address for the **Phone 2** port would be *070EA2603201*.

Note By default, both Cisco ATA FXS ports are enabled for Cisco CallManager registration. If you do not want to add the **Phone 2** FXS port to Cisco CallManager, you must change the Cisco ATA *EPID1orSID1* parameter value to 0 to disable the **Phone 2** port. (To disable the **Phone 1** port, you must change the *EPID0orSID0* parameter value to 0.)

Using the Cisco Bulk Administration Tool (BAT)

The Cisco Bulk Administration Tool (BAT) is a plug-in application for Cisco CallManager that enables system administrators to perform batch operations, including registration, on large numbers of Cisco IP Phones and Cisco ATAs.

Refer to the *Bulk Administration Tool Guide for Cisco CallManager* for instructions on using BAT to add Cisco ATAs to the Cisco CallManager.

You will need to know the following information when you use the BAT tool:

- When you use the Phone Type drop-down list, make your device-type selections as follows:
  - If you are using Cisco CallManager version 3.0 or 3.1, select **Cisco 7960**.
  - If you are using Cisco CallManager version 3.2, select **Cisco ATA 186**.
- When you use the Phone Configuration screen, you must enter information in the following fields:
  - MAC Address—Enter the MAC address of the Cisco ATA. The MAC address is labeled at the bottom of the Cisco ATA. (You can also use the atapname.exe tool to determine the MAC address of the Cisco ATA. For information on how to use thiis tool, see the "Using atapname.exe Tool to Obtain MAC Address" section on page 3-13.)
  - Device Pool—Select either the **Default** value or a configured device pool from the drop-down list.
  - Phone Button Template—From the drop-down list, select **Standard 7960** if you are using Cisco CallManager version 3.0 or 3.1; select **Standard ATA 186** if you are using Cisco CallManager version 3.2

- If you want to add a second Cisco ATA FXS port to Cisco CallManager, you need to fabricate a MAC address for the **Phone 2** port by dropping the two left-most digits from the Cisco ATA MAC address and add the digits **01** to the right-most portion of the MAC address.

  Example

  If the MAC address of the Cisco ATA is *00070EA26032*, then the fabricated MAC address for the **Phone 2** port would be *070EA2603201*.

Note By default, both Cisco ATA FXS ports are enabled for Cisco CallManager registration. If you do not want to add the **Phone 2** FXS port to Cisco CallManager, you must change the Cisco ATA *EPID1orSID1* parameter value to 0 to disable the **Phone 2** port. (To disable the **Phone 1** port, you must change the *EPID0orSID0* parameter value to 0.)

Using Auto-Registration

Use auto-registration if you want Cisco CallManager to assign directory numbers automatically to new Cisco ATAs as they connect to the IP telephony network. Once a Cisco ATA has auto-registered, you can move the Cisco ATA to a new location and assign it to a different device pool without affecting its directory number.

To perform auto registration, see the applicable release version of the *Cisco CallManager Administration Guide* at the following location:

http://www.cisco.com/en/US/products/sw/voicesw/ps556/products_administration_guide_books_list.html

CHAPTER 5

Parameters and Defaults

This section provides information on the parameters and defaults that you can use to create your own Cisco ATA configuration file. This section also includes the voice configuration menu code for each parameter that has such a code.

Some parameters on the Web Configuration screen are not used for SCCP; only those used for SCCP are covered in this section.

Parameters are divided into categories based on their functionality. The following categories of parameters are covered in this section:

- User Interface (UI) Parameter, page 5-3
- Parameters for Configuration Method and Encryption, page 5-4
- Network Parameters, page 5-6
- Account Information Parameters, page 5-8
- SCCP Mode Parameter, page 5-10
- Operating Parameters, page 5-10
- Optional Feature Parameters, page 5-19

The following list contains general configuration information:

- Your configuration file must begin with **#txt**.
- The Cisco ATA uses the following parameter types:
  - Alphanumeric string
  - Array of short integers
  - Boolean (1 or 0)
  - Bitmap value—unsigned hexadecimal integer (for specifying bits in a 32-bit integer)
  - Extended IP address—IP address followed by port number (for example, 192.168.2.170.9001)
  - IP address (e.g. 192.168.2.170)
  - Integer (32-bit integer)
  - Numeric digit string

Note The term *Cisco ATA* is used throughout this manual to refer to both the Cisco ATA 186 and the Cisco ATA 188, unless differences between the Cisco ATA 186 and Cisco ATA 188 are explicitly stated.

Note This section contains recommended values for the United States and Sweden as configuration examples for certain parameters. For information about other countries, contact the Cisco equipment provider for a specific country.

Configuration Text File Template

This is a listing of the sk_example.txt text file, without its annotations, that comes bundled with the Cisco ATA software.

You can make a copy of this file and use it as a template for creating your own default configuration file or Cisco ATA-specific configuration file. For instructions on how to create these configuration files, see the "Creating a Cisco ATA Default Configuration File" section on page 3-10 and the "Creating a Configuration File for a Specific Cisco ATA" section on page 3-12.

The sk_example.txt file contains all the Cisco ATA default values. The sections that follow this listing describe all the parameters in this file.

```
#txt
UIPassword:0
UseTftp:1
TftpURL:0
cfgInterval:3600
EncryptKey:0
ToConfig:0
upgradecode:0,0x301,0x0400,0x0200,0.0.0.0,69,0,none
upgradelang:0,0x301,0x0400,0x0200,0.0.0.0,69,0,none
Dhcp:1
StaticIp:0
StaticRoute:0
StaticNetMask:0
CA0orCM0:0
CA1orCM1:0
CA0UID:0
CA1UID:0
EPID0orSID0:.
EPID1orSID1:.
PrfCodec:1
LBRCodec:3
AudioMode:0x00350035
NumTxFrames:2
CallerIdMethod:0x00019e60
ConnectMode:0x90000400
DNS1IP:0.0.0.0
DNS2IP:0.0.0.0
UDPTOS:0xA0
RingCadence:2,4,25
DialTone:2,31538,30831,1380,1740,1,0,0,0
BusyTone:2,30467,28959,1191,1513,0,4000,4000,0
ReorderTone:2,30467,28959,1191,1513,0,2000,2000,0
RingBackTone:2,30831,30467,1943,2111,0,16000,32000,0
CallWaitTone:1,30831,0,5493,0,0,2400,2400,4800
ConfirmTone:1,30467,0,5970,0,0,480,480,1920
MediaPort:16384
UseMGCP:0
MGCPPort:2427
RetxIntvl:500
RetxLim:7
MGCPVer:MGCP1.0
```

```
NPrintf:0
TraceFlags:0x00000000
SigTimer:0x00000064
CodecName:PCMU,PCMA,G723,G729
OpFlags:0x2
VLANSetting:0x0000002b
```

User Interface (UI) Parameter

This parameter type contains one parameter—UIPassword.

UIPassword

Description

This parameter controls access to web page or voice configuration menu interface. To set a password, enter a value other than zero.

To clear a password, change the value to 0.

You cannot recover a forgotten password unless you reset the entire configuration of the Cisco ATA (see the "Resetting the Cisco ATA to Factory Default Values" section on page 3-20). If you forget a password, you can contact your Cisco representative.

Note When UIPassword contains letters, you cannot enter the password from the telephone keypad.

Value Type

Alphanumeric string

Range

Maximum nine characters

Default

0

Voice Configuration Menu Access Code

7387277

Related Parameter

OpFlags, page 5-17 (bit 7)

Parameters for Configuration Method and Encryption

This section describes parameters for instructing the Cisco ATA how to locate its TFTP server and how to encrypt its configuration file. These parameters are:

- UseTFTP, page 5-4
- TftpURL, page 5-4
- EncryptKey, page 5-5

UseTFTP

Settings

1—Use the TFTP server for Cisco ATA configuration.

0—Do not use the TFTP server for Cisco ATA configuration.

Value Type

Boolean

Range

0 or 1

Default

1

Voice Configuration Menu Access Code

305

Related Parameters

- TftpURL, page 5-4
- EncryptKey, page 5-5
- OpFlags, page 5-17 (bits 0 and 3)

TftpURL

Description

Use this parameter to specify the IP address or URL of the TFTP server. This string is needed if the DHCP server does not provide the TFTP server IP address. When the TftpURL parameter is set to a non-zero value, this parameter has priority over the TFTP server IP address supplied by the DHCP server.

Optionally, you can include the path prefix to the TFTP file to download.

For example, if the TFTP server IP address is 192.168.2.170 or www.cisco.com, and the path to download the TFTP file is in /ata186, you can specify the URL as 192.168.2.170/ata186 or www.cisco.com/ata186.

Note From the voice configuration menu, you can only enter the IP address; from the web configuration page, you can enter the actual URL.

Value Type

Alphanumeric string

Range

Maximum 31 characters

Default

0

Voice Configuration Menu Access Code

905

Related Parameters

- UseTFTP, page 5-4
- Domain, page 5-16

EncryptKey

Description

This parameter specifies the encryption key that is used to encrypt the Cisco ATA configuration file on the TFTP server.

The cfgfmt tool, which is used to create a Cisco ATA binary configuration file (see the "Using the EncryptKey Parameter and cfgfmt Tool" section on page 3-14), automatically encrypts the binary file, using the rc4 encryption algorithm, when the EncryptKey parameter has a value other than 0.

Note If the Cisco ATA configuration file is not encrypted, the value must be set to 0.

Value Type

Alphanumeric string

Range

Maximum eight characters

Default

0

Voice Configuration Menu Access Code

320

Related Parameters

- UseTFTP, page 5-4
- TftpURL, page 5-4

Network Parameters

This section describes the parameters for enabling or disabling the use of a DHCP server to obtain IP address information, and parameters that you need to statically configure if you disable DHCP:

- DHCP, page 5-6
- StaticIp, page 5-7
- StaticRoute, page 5-7
- StaticNetMask, page 5-8

DHCP

Description

A DHCP server can be used to automatically set the Cisco ATA IP address, the network route IP address, the subnet mask, DNS, NTP, TFTP, and other parameters.

- 1—Enable DHCP
- 0—Disable DHCP

Value Type

Boolean

Range

0 or 1

Default

1

Voice Configuration Menu Access Code

20

Related Parameters

- StaticIp, page 5-7
- StaticRoute, page 5-7
- StaticNetMask, page 5-8
- OpFlags, page 5-17 (bits 3 and 11)

StaticIp

Description
Configure the Cisco ATA IP address using this parameter if the DHCP parameter is set to 0.

Value Type
IP address

Default
0.0.0.0

Voice Configuration Menu Access Code
1

Related Parameters
- DHCP, page 5-6
- StaticRoute, page 5-7
- StaticNetMask, page 5-8

StaticRoute

Description
Configure the Cisco ATA statically assigned route in this parameter if the DHCP parameter is set to 0.

Value Type
IP address

Default
0.0.0.0

Voice Configuration Menu Access Code
2

Related Parameters
- DHCP, page 5-6
- StaticIp, page 5-7
- StaticNetMask, page 5-8

StaticNetMask

Description

Configure the statically assigned subnet mask using this parameter if the DHCP parameter is set to 0.

Value Type

IP address

Default

255.255.255.0

Voice Configuration Menu Access Code

10

Related Parameters

- DHCP, page 5-6
- StaticIp, page 5-7
- StaticRoute, page 5-7

Account Information Parameters

This section describes the following identification parameters:

- EPID0orSID0 and EPID1orSID1, page 5-8
- CA0orCM0 and CA1orCM1, page 5-9

EPID0orSID0 and EPID1orSID1

SID*x* specifies whether to enable the **Phone 1** and/or **Phone 2** ports on the Cisco ATA to register with Cisco Call Manager. (EPID*x* is not for SCCP.) SID*x* can be one of the following values:

- 0—Disables port; port does not attempt to register with Cisco CallManager
- **.** or <mac_address>—Uses the default Skinny ID, which is the Cisco ATA MAC address (MAC) for the **Phone** 1 port and MAC[1-5]+01 for the **Phone 2** port. The port attempts to register with Cisco CallManager.
- For example, if the MAC address of the Cisco ATA is 0001.2D01.073D, then SID0 is 0001.2D01.073D and SID1 is 012D.0107.3D01.
- Other values are reserved.

Value Types

Alphanumeric string for each parameter

Range

Maximum 51 characters for each parameter

Voice Configuration Menu Access Codes

46 and 47 for EPID0orSID0 and EPID1orSID1, respectively

CA0orCM0 and CA1orCM1

Description

CM*x* specifies the IP address (with an optional port number) or the URL of the primary or secondary Cisco CallManager to which the Cisco ATA should register. Use the CM0 parameter for the primary Cisco CallManager and the CM1 parameter for the secondary Cisco CallManager parameter. (CA*x* is not for SCCP.)

Note Use this parameter only if the default Cisco CallManager TFTP method is not desirable for configuring the Cisco CallManager IP address, in which case you must set the UseTftp parameter to 0.

If you specify a Cisco CallManager port, you must separate the port number from the host IP address with a colon (:).

Examples

Examples of CA0orCM0 values follow:

- 192.168.1.2:2727
- ca.cisco.com.

Value Type

Alphanumeric string

Range

Maximum 31 characters

Default

0

Voice Configuration Menu Access Code

5 and 6, respectively

Related Parameters

- UseTFTP, page 5-4
- Domain, page 5-16

SCCP Mode Parameter

This parameter (UseMGCP) is located in the yellow portion of the Cisco ATA web configuration page. The other parameters in this portion of the screen are not for SCCP.

UseMGCP

Description

Set this parameter to 0 if you are using the Cisco ATA as an SCCP client. (Set this parameter to 1 if you are using the Cisco ATA as an MGCP client.)

Value Type

Boolean

Range

0 or 1

Default

0

Voice Configuration Menu Access Code

38

Other Parameters

This remaining parameters in the yellow portion of the configuration screen are not used for SCCP:

- CA0UID
- CA1UID
- MGCPVer
- RetxIntv
- RetxLim
- MGCPPort
- CodecName

Operating Parameters

The parameters described in this section include parameters for configuring codecs, fax features and VLAN settings:

- LBRCodec, page 5-11
- PrfCodec, page 5-12
- AudioMode, page 5-12
- ConnectMode, page 5-13

- CallerIdMethod, page 5-14
- DNS1IP, page 5-15
- DNS2IP, page 5-16
- Domain, page 5-16
- NumTxFrames, page 5-17
- UDPTOS, page 5-17
- OpFlags, page 5-17
- VLANSetting, page 5-18

LBRCodec

Description

This parameter is used for selecting the low-bit-rate codec. The following values are valid:

- 0—Select G.723.1 as the low-bit-rate codec (available only for connections 0 and 2).
- 3—Select G.729A as the low-bit-rate codec (available only for connection 0).

If LBRCodec=0, then both Cisco ATA FXS ports can operate with the following codecs:

- Number of codecs=3
- Codec[0]=G.711µ -law
- Codec[1]=G.711A-law
- Codec[2]=G.723.1

If LBRCodec=3, check the setting of bit 21 in the ConnectMode parameter (see the "ConnectMode" section on page 5-13) to determine if G.729 is enabled for the **Phone 1** or **Phone 2** FXS port.

If LBRCodec=3, then the **Phone 1** FXS port can operate with the following codecs:

- Number of codecs=4
- Codec[0]=G.711µ-law
- Codec[1]=G.711A-law
- Codec[2]=G.729 (only if Bit 21 of the ConnectMode parameter is set to 0)
- Codec[3]=G.729A

If LBRCodec=3, then the **Phone 2** FXS port can operate with the following codecs:

- Number of codecs=3
- Codec[0]=G.711µ-law
- Codec[1]=G.711A-law
- Codec[2]=G.729 (only if Bit 21 of the ConnectMode parameter is set to 1)

Value Type

Integer

Range

0 or 3

Default

3

Voice Configuration Menu Access Code

300

Related Parameters

ConnectMode, page 5-13 (bit 21)

AudioMode, page 5-12 (bits 1 and 17)

PrfCodec

Description

Not used for SCCP.

AudioMode

Description

This parameter is used for the audio operating mode. The lower 16 bits are for the **Phone 1** FXS port, and the upper 16 bits are for the **Phone 2** FXS port. Table 5-1 provides definitions for each bit.

Value Type

Bitmap

Default

0x00350035

Voice Configuration Menu Access Code

312

Related Parameters

- LBRCodec, page 5-11
- ConnectMode, page 5-13

Table 5-1 AudioMode Parameter Bit Definitions

Bit Number	Definition
0	0/1—Disable/enable G.711 silence suppression for all codecs. **Note** When Bit 0 is set to 1, the Cisco ATA checks the silence suppression setting on the Cisco CallManager to determine if silence suppression should be applied to the call. When Bit 0 is set to 0, the Cisco ATA will not use silence suppression regardless of the silence suppression setting on the Cisco CallManager.
1	0—Enable selected low-bit-rate codec in addition to G.711. This setting is the default. 1—Enable G.711 only.
2	0/1—Disable/enable fax CED tone detection.
3-15	Reserved.

ConnectMode

Description

This parameter is a 32-bit bitmap to control the connection mode of the selected call signalling protocol. Table 5-2 provides bit definitions for this parameter.

Value Type

Bitmap

Default

0x90000400

Voice Configuration Menu Access Code

311

Related Parameters

- AudioMode, page 5-12
- LBRCodec, page 5-11

Table 5-2 ConnectMode Parameter Bit Definitions

Bit Number	Definition
0-1	Reserved.
2	0—Use the dynamic payload type 126/127 as the RTP payload type (fax pass-through mode) for G.711 µ-law/G.711 A-law. 1—Use the standard payload type 0/8 as the RTP payload type (fax pass-through mode) for G.711 µ-law/G.711 A-law.
3-6	Reserved.
7	0/1—Disable/enable fax pass-through redundancy.

Table 5-2 ConnectMode Parameter Bit Definitions (continued)

Bit Number	Definition
8-12	Specifies the fax pass-through NSE payload type. The value is the offset to the NSE payload base number of 96. The valid range is 0-23; the default is 4. For example, if the offset is 4, the NSE payload type is 100.
13	0—Use G.711μ-law for fax pass-through codec. 1—Use G.711A-law for fax pass-through codec.
14-15	0—Use fax pass-through. 1—Use codec negotiation in sending fax. 2,3—Reserved.
16-20	Reserved.
21	0—Enable G729 on the **Phone 1** FXS port. 1—Enable G729 on the **Phone 2** FXS port.
22-27	Reserved.
28-29	0—Select the Cisco ATA Style for mid-call services. Services are call hold/resume, call transfer and conference call. 1—Select the Bellcore Style for mid-call services. Services are call transfer and conference call. 2—Select the Cisco VG248 Style for mid-call services. Services are three-way calling, call transfer and conference call. For end-user procedures of each service that the Cisco ATA supports for each style, see Appendix A, "How to Use Pre-call and Mid-call Services."
30	0/1—Disable/enable Cisco IOS Telephony Solution (ITS). Cisco ITS runs on an IOS router and is a subset of Cisco CallManager. If you have Cisco ITS, refer to the documentation for that product.
31	0 - Disable XML configuration file support (use if you are running Cisco CallManager version 3.0). 1 - Enable XML configuration file support (use if you are running Cisco CallManager version 3.1 or later).

CallerIdMethod

Description

This 32-bit parameter specifies the signal format to use for both FXS ports for generating Caller ID format. Possible values are:

- Bits 0-1 (method)—0=Bellcore (FSK), 1=DTMF, values 2 and 3 are reserved.

If *method=0*, set the following bits:

- Bit 3 to 8—Use these bits for setting the maximum number of digits in the phone number portion (valid values are 1 to 20).
- Bit 9 to 14—Use these bits for setting the maximum number of digits in the name number portion (valid values are 1 to 20).
- Bit 15—Use special character **O**.
- Bit 16—Use special character **P**.

If *method=1*, set the following bits:

- Bits 3-6—These bits are for the Start digit (valid values are **12** for “A,” **13** for “B,” **14** for “C,” and **15** for “D.”).
- Bits 7-10—These bits are for the End digit (valid values are **11** for “#,” **12** for “A,” **13** for “B,” **14** for “C,” and **15** for “D.”).
- Bits 11—This bit is for setting polarity reversal before and after the Caller ID signal (value of 0/1 disables/enables polarity reversal).
- Bits 12-16—These bits are for the maximum number of digits in the phone number (valid values are 1 to 20).

Examples

The following examples are recommended values for the CallerID Method parameter:

- Sweden=0x0ff61
- Denmark=0x0fde1
- USA=0x19e60

Value Type

Bitmap

Default

0x00019e60

Voice Configuration Menu Access Code

316

DNS1IP

Description

This parameter is for setting the primary domain name server (DNS) IP address, if the DHCP server does not provide one. If DHCP provides DNS1IP (and if it is non-zero), this parameter overwrites the DHCP-supplied value. You *cannot* specify a port parameter. The Cisco ATA uses the default DNS port only.

Value Type

IP address

Default

0.0.0.0

Voice Configuration Menu Access Code

916

Related Parameter

DHCP, page 5-6

DNS2IP

Description

This parameter is for setting the secondary domain name server (DNS) IP, if the DHCP server does not provide one. If DHCP provides DNS2IP (if it is non-zero), this parameter overwrites the DHCP-supplied value. You cannot specify a port parameter. The Cisco ATA uses the default DNS port only.

Value Type

IP address

Default

0.0.0.0

Voice Configuration Menu Access Code

917

Related Parameter

DHCP, page 5-6

Domain

Description

The Cisco ATA uses the value of this parameter for a DNS search if either the TftpUrl or CM0orCA0 parameters do not contain a fully qualified domain name. For example, if *cm1* is specified as the Cisco CallManager URL, and cisco.com is the value of the Domain parameter, then the Cisco ATA uses *cm1@cisco.com* for its DNS search.

The following values are valid:

- Dot (.) or blank—Uses DHCP-provided IP address if available; otherwise use static IP address.
- 0—Uses DHCP-provided domain name if available; otherwise use static IP address.
- *—Uses Cisco ATA MAC address.
- String—Uses specified string.

Value Type

Alphanumeric string

Range

Maximum 31 characters

Default

.

Voice Configuration Menu Access Code

931

Related Parameters

- TftpURL, page 5-4
- CA0orCM0 and CA1orCM1, page 5-9

NumTxFrames

Description

Not used for SCCP. For information about RTP packet size configuration, which is controlled by the Cisco CallManager, refer to your Cisco CallManager documentation.

UDPTOS

Description

Use this parameter to specify the default IP precedence (ToS bit) of UDP packets. Set the lower eight bits only, as follows:

- Bits 0-1: Unused
- Bit 2: Reliability bit—1=request high reliability
- Bit 3: Throughput bit—1=request high throughput
- Bit 4: Delay bit—1=request low delay
- Bits 5-7: Specify datagram precedence. Values range from 0 (normal precedence) to 7 (network control).

Value Type

Bitmap

Default

0xB8

Voice Configuration Menu Access Code

255

OpFlags

Description

Use this parameter to enable/disable various operational features.

See Table 5-3 for bit definitions of this parameter.

Value Type

Bitmap

Default

0x2

Voice Configuration Menu Access Code

323

Related Parameters

- TftpURL, page 5-4
- DHCP, page 5-6
- VLANSetting, page 5-18

Table 5-3 OpFlags Parameter Operational Features to Turn On or Off

Bit Number	Definition
0	If Bit 0 = 0, the TFTP configuration filename supplied by the DHCP server overwrites the default filename for each Cisco ATA. If Bit 0 = 1, the default Cisco ATA filename is always used.
1	If Bit 1 = 0, the Cisco ATA probes the static network router during the power-up process. If Bit 1 = 1, static network router probing is disabled.
2	Reserved.
3	If Bit 3=1, the Cisco ATA does not request DHCP option 150 in the DHCP discovery message; some DHCP servers do not respond if option 150 is requested.
4	If Bit 4 = 1, the Cisco ATA use the VLAN ID specified in the VLANSetting parameter for VLAN IP encapsulation (see the "VLANSetting" section on page 5-18).
5	If Bit 5=1, the Cisco ATA disables VLAN IP encapsulation.
6	If Bit 6=1, the Cisco ATA does not perform CDP discovery.
7	If Bit 7=1, the Cisco ATA does not allow web-based configuration.
8-10	Reserved.
11	If Bit 11=0, the Cisco ATA requests the device hostname from the DHCP server. If Bit 11=1, the Cisco ATA uses the device hostname that is specified in DHCP option 12.
12-31	Reserved.

VLANSetting

Description

This parameter is used for specifying VLAN-related settings.

Bitmap definitions are as follows for the VLANSetting parameter:

- Bits 0-2—Specify VLAN CoS bit value (802.1 P priority) for TCP packets.
- Bits 3-5—Specify VLAN CoS bit value (802.1 P priority) for UDP packets.
- Bits 6-17—Reserved.
- Bits 18-29—User-specified 802.1Q VLAN ID.
- Bits 30-31—Reserved.

Value Type
Bitmap

Default
0x0000002b

Voice Configuration Menu Access Code
324

Related Parameter
OpFlags, page 5-17

Optional Feature Parameters

This section includes the parameters used to configure various timeout values and call-progress tones:

- SigTimer, page 5-19
- RingCadence, page 5-20
- Call-Progress Tone Parameters, page 5-21
- NPrintf, page 5-26
- TraceFlags, page 5-27
- MediaPort, page 5-27

SigTimer

Description
This parameter controls various timeouts. Table 5-4 contains bit definitions of this parameter.

Value Type
Bitmap

Default
0x00000064

Voice Configuration Menu Access Code
318

Related Parameter
CallWaitTone, page 5-25

Table 5-4 SigTimer Parameter Bit Definitions

Bit Number	Definition
0-7	Call waiting period—The period between each burst of call-waiting tone. Range: 0 to 255 in 0.1 seconds Default: 100 (0x64=100 seconds)
8-15	Not used for SCCP.
16-25	Reserved—Should be set to 0.
26-27	Minimum hook flash time—The minimum on-hook time required for a hook flash event. Range: 0 to 3 Default: 0 (60 ms) Other possible values: 1=100 ms, 2=200 ms, 3=300 ms.
28-31	Maximum hook flash time—The maximum on-hook time allowed for a hook flash event. Range: 0 to 15 Default: 0 (1000 ms) Other possible values: 1=100 ms, 2=200 ms, 3=300 ms, 4=400 ms, 5=500 ms, 6=600 ms, 7=700 ms, 8=800 ms, 9=900 ms, 10=1000 ms, 11=1100 ms, 12=1200 ms, 13=1300 ms, 14=1400 ms, 15=1500 ms.

RingCadence

Description

Use this parameter to specify the internal and external ringer cadence pattern, expressed as a triplet of integers “a,b, and c”.

- a—Number of seconds to turn the ring ON.
- b—Number of seconds to turn the ring OFF.
- c—The ring frequency, fixed at 25.

Value Type

List of three integer values, separated by commas

Range

1-65535

Default

2, 4, 25

Recommended Values:

- United States —2,4,25
- Sweden — 1,5,25

Voice Configuration Menu Access Code

929

Call-Progress Tone Parameters

This section covers all the call-progress tones that the Cisco ATA supports, and contains the following topics:

- List of Call-Progress Tone Parameters, page 5-21
- Tone Parameter Syntax, page 5-21
- How to Calculate Scaling Factors, page 5-22
- Recommended Values, page 5-22
- Specific Call-Progress Tone Parameter Information, page 5-23

List of Call-Progress Tone Parameters

The following list contains the names of the call-progress tone parameters:

- DialTone
- BusyTone
- ReorderTone
- RingBackTone
- CallWaitTone
- ConfirmTone

Tone Parameter Syntax

Each tone is specified by nine integers, as follows:

ntone, freq0, freq1, level0, level1, steady, on-time, off-time, total-tone- time

- **ntone** is the number of frequency components (0, 1 or 2).
- **freq[0]** (Hz) is the transformed frequency of the first frequency component (-32768 to 32767).

Note Only positive values can be configured to the Cisco ATA 186. For negative values, use the 16-bit 2's-complement value. For example, enter -1 as 65535 or 0xffff.

- **freq[1]** is the transformed frequency of the second frequency component (-32768 to 32767).
- **level[0]** is the transformed amplitude of the first frequency component (-32768 to 32767).
- **level[1]** is the transformed amplitude of the second frequency component (-32768 to 32767).
- **steady** controls whether the tone is constant or intermittent. A value of 1 indicates a steady tone and causes the Cisco ATA to ignore the on-time and off-time parameters. A value of 0 indicates an on/off tone pattern and causes the Cisco ATA to use the on-time and off-time parameters.
- **on-time** controls the length of time the tone is heard in milliseconds (ms) expressed as an integer from 0 to 0xffff sample at 8000 samples/second.
- **off-time** controls the length of time between audible tones in milliseconds (ms) expressed as an integer from 0 to 0xffff sample at 8000 samples/second.

- **total-tone-time** controls the length of time the tone is audible (0 to 0xffff). If this value is set to 0, the tone will play until another call event stops the tone. For DialTone, BusyTone, ReorderTone, and RingBackTone, the configurable value is the number of 10 ms (100 = 1 second) units.

  For the other tones, the value is the number of samples at 8000 samples/second, where the following information applies:

  - Frequency ranges from 0 to 4000 (Hz)
  - Transformed Frequency = 32767 · cos (2pi·Frequency/8000)
  - Amplitude ranges from 0 to 32767
  - Transformed Amplitude = *A* · 32767 · sin (2pi·Frequency/8000)

  The scaling factor *A* determines the volume level of the tone. To calculate scaling factors, see the "How to Calculate Scaling Factors" section on page 5-22.

Note All tones are persistent (until the Cisco ATA changes state) except for the call-waiting tone and the confirm tone. The call-waiting tone, however, repeats automatically once every 10 seconds while the call-waiting condition exists.

How to Calculate Scaling Factors

Use the following formula to calculate the scaling factor *A*:

$A=0.5 * 10^{\wedge((k+10-(n-1)*3)/20)}$

In this formula, *k* is the desirable volume in dBm; *n* is the number of frequency components. The ^ means *to the order of.*

Example

If a one-frequency component of -20 dBm volume level is desirable, then:

$A=0.5 * 10^{\wedge((-20+10)/20)} = 0.16$

Recommended Values

The following settings are recommended for the US:

- DialTone = "2,31538,30831,3100,3885,1,0,0,1000" (approximately -10 dBm)
- BusyTone = "2,30467,28959,1191,1513,0,4000,4000,0" (approximately -21 dBm)
- ReorderTone = "2,30467,28959,1191,1513,0,2000,2000,0" (approximately -21 dBm)
- RingBackTone = "2,30831,30467,1943,2111,0,16000,32000,0" (approximately -16 dBm)
- CallWaitTone = "1,30831,0,5493,0,0,2400,2400,4800" (approximately -10 dBm)
- ConfirmTone = "1,30467,0,5970,0,0,480,480,1920" (approximately -10 dBm)

The following settings are recommended for Sweden:

- DialTone = "1,30959,0,4253,0, 1, 0, 0,1500" (approximately -5 dBm)
- BusyTone = "1,30959,0,2392,0, 0, 2000, 2000,0" (approximately -10 dBm)
- ReorderTone = "1,30959,0,2392,0, 0, 2000, 6000,0" (approximately -10 dBm)
- RingBackTone = "1,30959,0,2392,0, 0, 8000, 40000,0" (approximately -10 dBm)

- CallWaitTone = "1,30959,0,2392,0, 0, 1600, 4000,11200" (approximately -10 dBm)
- ConfirmTone = "1,30959,0,2392,0, 0, 480, 480,1920" (approximately -10 dBm)

Specific Call-Progress Tone Parameter Information

Brief descriptions, and lists of default values and the voice configuration menu code for each Cisco ATA tone parameter, appear in the following sections:

- DialTone, page 5-23
- BusyTone, page 5-24
- ReorderTone, page 5-24
- RingbackTone, page 5-25
- CallWaitTone, page 5-25
- ConfirmTone, page 5-26

DialTone

Description

The Cisco ATA plays the dial tone when it is ready to accept the first digit of a remote address to make an outgoing call.

This parameter is for specifying the inside dial tone in SCCP. The outside dial tone in SCCP is fixed at 450Hz+540Hz@-6dBm. The inside dial tone is the tone that the telephone plays when a phone inside the PBX goes off-hook. The outside dial tone is the tone that the telephone plays when a phone inside the PBX is connected to the PSTN.

Default values for the nine-integer array

- ntone—2
- freq0—31538
- freq1—30831
- level0—1380
- level1—1740
- steady—1
- on-time—0
- off-time—0
- total time to play tone—1000

Voice Configuration Menu Access Code

920

BusyTone

Description

The Cisco ATA plays the busy tone when the callee is busy.

Default values for the nine-integer array

- ntone—2
- freq0—30467
- freq1—28959
- level0—1191
- level1—1513
- steady—0
- on-time—4000
- off-time—4000
- total time to play tone—0

Voice Configuration Menu Access Code

921

ReorderTone

Description

The Cisco ATA plays the reorder tone (also known as congestion tone) if the outgoing call failed for reasons other than busy.

Default values for the nine-integer array

- ntone—2
- freq0—30467
- freq1—28959
- level0—1191
- level1—1513
- steady—0
- on-time—2000
- off-time—2000
- total time to play tone—0

Voice Configuration Menu Access Code

922

RingbackTone

Description

The Cisco ATA plays the ring-back tone when the callee is being alerted by the called device.

Default values for the nine-integer array

- ntone—2
- freq0—30831
- freq1—30467
- level0—1943
- level1—2111
- steady—0
- on-time—16000
- off-time—32000
- total time to play tone—0

Voice Configuration Menu Access Code

923

CallWaitTone

Description

The Cisco ATA plays the call-waiting tone when an incoming call arrives while the user is connected to another party.

Default values for the nine-integer array

- ntone—1
- freq0—30831
- freq1—0
- level0—5493
- level1—0
- steady—0
- on-time—2400
- off-time—2400
- total time to play tone—4800

Voice Configuration Menu Access Code

924

ConfirmTone

Description

The Cisco ATA plays the confirm tone to prompt the user to enter a phone number when invoking a supplementary service, such as call-forwarding, or blind transfer.

Default values for the nine-integer array

- ntone—1
- freq0—30467
- freq1—0
- level0—5970
- level1—0
- steady—0
- on-time—480
- off-time—480
- total time to play tone—1920

Voice Configuration Menu Access Code

925

NPrintf

Description

Use this parameter to specify the IP address and port of a host to which all Cisco ATA debug messages are sent. The program *prserv.exe,* which comes bundled with the Cisco ATA software, is needed to capture the debug information.

Syntax

```
<HOST_IP>,<HOST_PORT>
```

Example

If the program *prserv.exe* is running on a host with IP address 192.168.2.170 and listening port 9001, set NPrintf to 192.168.2.170.9001. This causes the Cisco ATA to send all debug traces to that IP address.

Value Type

Extended IP address

Default

0

Voice Configuration Menu Access Code

81

Related Parameter

TraceFlags, page 5-27

TraceFlags

Description

This parameter is for diagnostic use. Bit values are as follows:

- Bits 0 to 6—Reserved
- Bit 7—SCCP message log (set to **0** for a simplified log; set to **1** for a detailed log).
- Bits 8 to 31—Reserved

Value Type

Bitmap

Default

0x00000000

Voice Configuration Menu Access Code

313

Related Parameters

NPrintf, page 5-26

MediaPort

Description

Use this parameter to specify the base port where the Cisco ATA transmits and receives RTP media. This parameter *must* be an even number. Each connection uses the next available even-numbered port for RTP.

Value Type

Integer

Range

1 to 65535

Default

16384

Voice Configuration Menu Access Code

202

Related Parameters

- UDPTOS, page 5-17
- VLANSetting, page 5-18

CHAPTER 6

Configuring and Debugging Fax Services

The Cisco ATA provides two modes of fax services that are capable of internetworking with Cisco IOS gateways over IP networks. These modes are called *fax pass-through mode* and *fax mode*.

With *fax pass-through mode*, the Cisco ATA encodes fax traffic within the G.711 voice codec and passes it through the Voice Over IP (VoIP) network as though the fax were a voice call. This mode uses the Cisco proprietary *fax upspeed* method.

With *fax mode*, the Cisco ATA presents itself as a device capable of using only G.711 codecs; therefore, no codec renegotiation or switchover is required. This places minimum functionality and configuration requirements on remote gateways. *Fax mode* is recommended for environments in which G.711 fax upspeed is not available for the supporting Cisco gateways.

This section contains the following topics:

- Using Fax Pass-through Mode, page 6-1
- Using FAX Mode, page 6-6
- Debugging the Cisco ATA 186/188 Fax Services, page 6-7

Note The term *Cisco ATA* is used throughout this manual to refer to both the Cisco ATA 186 and the Cisco ATA 188, unless differences between the Cisco ATA 186 and Cisco ATA 188 are explicitly stated.

Using Fax Pass-through Mode

Fax pass-through mode allows for maximum codec flexibility because users may set up a voice call using any voice codec, then renegotiate to a G.711 codec for the fax session. To use *fax pass-through mode*, first configure the Cisco ATA and supporting Cisco gateways to support the Cisco-proprietary G.711fax upspeed method. Then, disable fax relay on the far-end gateway—either for the entire gateway or for the dial peer engaged in the fax call with the Cisco ATA.

The fax upspeed method allows you to use low bit-rate codecs such as G.723 and G.729 for voice calls, and G.711 codecs for fax calls. With a fax call, the Cisco ATA detects a 2100-Hz CED tone or V.21 preamble flag, then informs the remote gateway of its intent to switchover to G.711 via a peer-to-peer message. This type of message, carried as a Named Signaling Event (NSE) within the RTP stream, is used for all fax event signaling. The Cisco ATA can initiate and respond to NSEs and can function as either an originating or terminating gateway.

Note The Cisco ATA can also accept standard-based protocol-level codec switch requests, but cannot send such requests. Therefore, to interoperate with a Cisco gateway, use the Cisco-proprietary codec switch.

This section contains the following topics:

- Configuring the Cisco ATA for Fax Pass-through mode, page 6-2
- Configuring Cisco IOS Gateways to Enable Fax Pass-through, page 6-3

Configuring the Cisco ATA for Fax Pass-through mode

Fax Pass-through mode requires configuring two configuration parameters:

AudioMode, page 6-2

ConnectMode, page 6-3

AudioMode

Description

The AudioMode parameter is a 32-bit value. The lower 16 bits apply to the **Phone 1** port of the Cisco ATA and the upper 16 bits apply to the **Phone 2** port of the Cisco ATA.

Example

The following is an example of configuring the **Phone 1** port of the Cisco ATA for *fax pass-through mode*:

```
0xXXXX0015
```

Translation

This setting translates to the following bitmap:

```
xxxx xxxx xxxx xxxx 0000 0000 0001 0101
```

- Bit 0 = 1—Enables G.711 silence suppression (VAD)
- Bit 2 = 1—Enables Fax CED tone detection and switchover upon detection
- Bit 4 = 1, Bit 5 = 0—DTMF transmission method = out-of-band through negotiation
- Bit 6 = Bit 7 = 0—Hookflash transmission method = disable sending out hookflash

Note The values xxxx in the example apply to the **Phone 2** port of the Cisco ATA.

To configure the same value for the **Phone 2** port of the Cisco ATA, the value would be `0x0015XXXX`. The configuration of one port is independent from the configuration of the other port.

ConnectMode

Description

The ConnectMode parameter is a 32-bit value. The parameter settings apply to both lines of the Cisco ATA. Configure ConnectMode after configuring AudioMode for *fax pass-through mode*. Cisco recommends you use the following ConnectMode setting to interoperate with a Cisco IOS gateway.

Recommended Setting

```
0x90000400
```

Translation

This setting translates to the bitmap:

```
1001 0000 0000 0000 0000 0100 0000 0000
```

Bit 2 and bits 7 through 15 are the only relevant bits for *fax pass-through mode*. These bits from the example are isolated below:

```
xxxx xxxx xxxx xxxx 0000 0100 0xxx x0xx
```

- Bit 2 = 0—Uses RTP payload number 126/127 for fax upspeed to G.711µ-law/G.711A-law. Set this value to 1 if you want to use RTP payload number 0/8 for fax upspeed.
- Bit 7 = 0—Disables fax pass-through redundancy. Set this bit to 1 to enable redundancy. With redundancy enabled, the Cisco ATA sends each packet twice. Because of bandwidth and transmission time costs, use this option only if network quality is poor and all other gateways used in the network support this feature.
- Bits {12, 11, 10, 9, 8} = {0, 0, 1, 0, 0}—Sets the offset to NSE payload-type number 96 to 4. Setting the offset to 4 results in the Cisco ATA sending an NSE payload-type value of 100 by default. Valid offset values range from 2 to 23 (NSE payload type value of 98 to 119). Set this value to match the value for your Cisco gateways.

  Most Cisco MGCP-based gateways, such as Cisco 6608, use NSE payload type 101 by default. Most Cisco H.323/SIP-based gateways use NSE payload type 100 by default.
- Bit 13 = 0—Uses G.711µ-law for fax pass-through upspeed. Set this bit to 1 to use G.711A for fax pass-through upspeed.
- Bit 14 = Bit 15 = 0—Enables *fax pass-through mode* using the Cisco proprietary method (recommended). Set both of these bits to 1 to disable *fax pass-through mode*.

Configuring Cisco IOS Gateways to Enable Fax Pass-through

To configure your IOS gateways to network with Cisco ATA, do the following:

Procedure

Step 1 Enable Fax Pass-through Mode, page 6-4

Step 2 Disable Fax Relay Feature, page 6-5

Note For detailed information on setting up your IOS gateways and on feature availability, refer to the document *Cisco Fax Services over IP.*

Enable Fax Pass-through Mode

The supporting Cisco gateway can enable *fax pass-through mode* using system-level or dial-peer-level commands.

System Level commands

Enable the fax pass-through feature using the following system-level commands:

Procedure

Step 1 Run the following command:

voice service voip

Step 2 Run the following command:

modem passthrough NSE [payload-type *number*] codec {g711μ/law | g711alaw} [redundancy] [maximum-sessions *value*]

The definitions of the command parameters are as follows:

- The **payload-type** parameter default is 100. Valid values are from 98 to 119.

  The NSE payload number must be the same on both the Cisco ATA and the Cisco gateway.
- The **codec** parameter must be G.711μ-law for faxes sent over a T1 trunk or G.711A-law for faxes sent over an E1 trunk.
- The **redundancy** parameter enables RFC 2198 packet redundancy. It is disabled by default.
- The **maximum sessions** parameter defines the number of simultaneous fax pass-through calls with redundancy. The default is 16. Valid values are 1 to 26.

When using the **voice service voip** and **modem passthrough nse** commands on a terminating gateway to globally set up fax or modem pass-through with NSEs, you must also ensure that each incoming call will be associated with a VoIP dial peer to retrieve the global fax or modem configuration. You associate calls with dial peers by using the **incoming called-number** command to specify a sequence of digits that incoming calls can match. You can ensure that all calls will match at least one dial peer by using the following commands:

```
Router(config)# dial-peer voice tag voip
Router(config-dial-peer)# incoming called-number .
```

Step 3 For the Cisco ATA ConnectMode parameter, turn off bits 14 and 15. This enables the sending of fax pass-through signals and the detection of incoming fax pass-through signals using the Cisco proprietary method.

Note The NSE payload-type number, fax pass-through codec (G.711μ-law or G.711A-law) and redundancy parameters must have the same settings for the Cisco ATA that they have for supporting Cisco gateways.

Dial-Peer Level Commands

You can enable *fax pass-through mode* for communication between a Cisco IOS gateway and the specified Cisco ATA using the following dial-peer level commands:

Procedure

Step 1 Perform the command:

dial-peer voice *tag* voip

Step 2 Perform the command:

modem passthrough {NSE [payload-type *number*] codec {g711μlaw | g711alaw} [redundancy] | system}

a. The default of this command is:

modem passthrough system

When using the default configuration, the dial-peer fax pass-through configuration is defined by the **voice service voip** command. When the **system** option is used, no other parameters are available.

When the NSE is configured in the fax pass-through command at the dial-peer level, the fax pass-through definition in the **dial-peer** command takes priority over the definition in the **voice service voip** command.

b. The **payload-type *number***, **codec**, and **redundancy** parameters can also be used.

For example, the command:

modem passthrough NSE codec g711μlaw

means that the Cisco ATA will use the NSE payload-type number 100, G.711μ-law codec, and no redundancy in *fax pass-through mode*.

Step 3 When setting up dial-peer for fax pass-through, it is necessary to set up a pair of dial-peers for inbound and outbound calls between the Cisco ATA and Cisco IOS gateways. You do this by specifying the **destination-pattern** and **incoming-called number**. The **destination-pattern** should point to the Cisco ATA, while the incoming-called number should apply to all numbers that the Cisco ATA is allowed to dial.

Disable Fax Relay Feature

Fax relay may be enabled by default for some IOS gateways. If you do not disable the fax relay feature, it may override the precedence of fax/modem pass-through and cause the fax transmission to fail. It is necessary to disable fax relay at the dial-peer or system level with the following command:

fax rate disable

Using FAX Mode

Use *fax mode* when the gateways in the network do not support *fax pass-through mode* or dial-peer configuration.

You can set one or both lines of the Cisco ATA to G.711-only *fax mode*. This mode allows the fax machine connected to the Cisco ATA to communicate directly with the far endpoint with no fax signaling event occurring between the two gateways.

This section contains the following topics:

- Configuring the Cisco ATA for Fax Mode, page 6-6
- Configuring the Cisco IOS Gateway for Fax Mode, page 6-7

Configuring the Cisco ATA for Fax Mode

G.711-only *fax mode* operation requires configuration of one parameter—**AudioMode**.

Description

The AudioMode parameter is a 32-bit value. The lower 16 bits apply to the **Phone 1** port of the Cisco ATA, and the upper 16 bits to the **Phone 2** port. The following is an example of the **Phone 1** port of the Cisco ATA configured for G.711-only *fax mode*:

Example

```
0xXXXX0012
```

Translation

This setting translates to the bitmap:

```
xxxx xxxx xxxx xxxx 0000 0000 0001 0010
```

- Bit 0 = 0—Disables G.711 silence suppression (VAD).
- Bit 1 = 1—Uses G.711 only, does not user the low bit-rate codec.
- Bit 2 = 0—Disables Fax CED tone detection.
- Bit 4 = 1, Bit 5 = 0—DTMF transmission method: out-of-band through negotiation
- Bit 6 = Bit 7 = 0—Hookflash transmission method: disables sending out hookflash

Note The values `xxxx` in the example do not apply to the **Phone 1** port of the Cisco ATA.

To configure the same value for the **Phone 2** port of the Cisco ATA, the value would be `0x0012XXXX`. The configuration of one port is independent from the configuration of the other port.

Note The AudioMode configuration overrides the values of the following three parameters: RxCodec, TxCodec, and LBRCodec. For example, if these three parameters are each set to 0 (for G.723), the Cisco ATA would still use G.711 if AudioMode is set to 0x00120012. With this configuration, the Cisco ATA sends both G.711μ-law and G.711A-law as preferred codecs to a peer voice gateway.

Configuring the Cisco IOS Gateway for Fax Mode

On the Cisco gateway, disable both fax relay and fax pass-through at the dial-peer level or system level with the following commands:

Procedure

Step 1 Run the command:

fax rate disable

Step 2 Run the command:

no modem passthrough

Debugging the Cisco ATA 186/188 Fax Services

This section includes the following debugging topics for fax services:

- Common Problems When Using IOS Gateways, page 6-7
- Using prserv for Diagnosing Fax Problems, page 6-8
- Using rtpcatch for Diagnosing Fax Problems, page 6-12

Common Problems When Using IOS Gateways

Table 6-1 lists typical problems and actions that might solve these problems for situations in which the Cisco ATA is using fax over a Cisco IOS gateway.

Table 6-1 Solving Common Fax Problems

Problem	Action
The far-end gateway is not loaded with correct software image.	Cisco recommends IOS version 12.2 (11)T or higher for the Cisco 2600 and Cisco 3600, and IOS version 12.1 (3)T or higher for Cisco AS5300. The Cisco 6608 supports both the NSE and NTE methods of *fax pass-through mode*, beginning with software version D004030145S16608. To use *fax pass-through mode* with the Cisco 6608, the user must select 6608 NSE mode, and the NSE payload type must be reconfigured to match the Cisco ATA.
The Cisco ATA is not loaded with the proper software.	Cisco recommends using software version 2.14 or higher.
User is operating Cisco ATA software on an outdated model.	Cisco recommends using Cisco ATA models 186-I1, 186-I2, 188-I1, or 188-I2 (hardware platforms).

Table 6-1 Solving Common Fax Problems (continued)

Problem	Action
The Cisco ATA is not configured for *fax mode* or *fax pass-through mode*.	For *fax mode*, the AudioMode configuration parameter should be set to 0xXXXX0012 (X = value not applicable) for the **Phone 1** port of the Cisco ATA, and 0x0012XXXX for the **Phone 2** port. For *fax pass-through mode*, AudioMode should be set to 0xXXXX0015 for the **Phone 1** port of the Cisco ATA, and 0x0015XXXX for the **Phone 2** port.
The remote gateway is not configured for modem/*fax pass-through mode*.	When the Cisco ATA is configured for *fax pass-through mode*, all remote gateways must be configured with modem/*fax pass-through mode* either on a dial-peer level or system level.
Fax relay is not disabled on the remote gateway.	Fax relay is enabled by default on some Cisco gateways. When fax relay is enabled, it can override *fax pass-through mode* and cause fax failure. Examples of the CLI commands to disable fax relay for IOS gateways are as follows: • **fax rate disable** for H.323/SIP gateways • **mgcp fax t38 inhibit** for MGCP gateways
Fax/modem pass-through method on the remote gateway is not compatible with the Cisco NSE-based method.	Some Cisco gateways (such as Cisco VG248, and Cisco 6608) may use signaling messages based on RFC2833 for G.711 upspeed when loaded with older software images. This method is incompatible with the Cisco NSE-based method. You must check to make sure that the image on your gateway supports the Cisco NSE-based fax/modem pass-through. Otherwise, you must configure the Cisco ATA to use *fax mode*.
NSE payload types differ between gateways.	The Cisco ATA has a configurable NSE packet payload-type value whose default is 100. This value is compatible with the implementations of most Cisco gateways. However, some Cisco gateways use 101 as the NSE payload type. Ensure that all gateways in your environment use the same NSE payload type if you wish to successfully use *fax pass-through mode*.

Using prserv for Diagnosing Fax Problems

This section contains the following topics:

• prserv Overview, page 6-8
• Analyzing prserv Output for Fax Sessions, page 6-9

prserv Overview

prserv is a tool that runs on a Microsoft Windows-based PC and serves as a log server that captures debug information that the Cisco ATA sends to your PC IP address/port. The debug information is saved into a readable text file.

To enable your Cisco ATA to send debug information, you need to set the **NPrintf** configuration parameter to your PC IP address and an available port, as shown in the following procedure:

Procedure

Step 1 `<IP address>.<port>`

<IP address> is the IP address of your PC.

<port> is any unused port (any number from 1024 to 65535) on your PC.

Note You can the Nprintf parameter on the Cisco ATA configuration web page or with the TFTP-based configuration method.

Step 2 To operate the debug capture program prserv.exe, place the prserv program in a folder on your PC. At the DOS prompt, enter:

```
C:>prserv <port>
```

<port> is the port number you have selected. If <port> is omitted, the default port number is 9001.

As prserv receives debug information from the Cisco ATA, it displays the information on the DOS screen and saves it to the output file <port>.log.

Once you are finished capturing debug information, you can stop prserv by entering Ctrl-C at the DOS prompt. If you restart the process without changing the name of the log file, any new debug information is appended to the end of the original file.

Analyzing prserv Output for Fax Sessions

The debug log obtained from **prserv** is for detecting simple configuration problems.

Note A comprehensive understanding of the fax events requires the use of the **rtpcatch** tool (see the "Using rtpcatch for Diagnosing Fax Problems" section on page 6-12).

Table 6-2 lists log events relevant to analyzing a fax session.

Table 6-2 Debug Log Examples

Log event	Description
[*ch*] Enable encoder <*pt*>	Voice encoder type *pt* is enabled for the channel *ch,* where *pt* can be 0 for G.711µ-law, 4 for G.723.1, 8 for G.711A-law, and 18 for G.729. For example, `[0]Enable encoder 4` indicates that the Cisco ATA transmitted G.723.1-encoded voice packets.
[*ch*] DPKT 1st: <*timestamp1*> <*timestamp2*>, pt <*pt*>	The first voice packet that the Cisco ATA received was of RTP payload type *pt* for the channel *ch* with timestamp of *timestamp1,* and the local decoding timestamp was set to *timestamp2*. For example, `[0]DPKT 1st: 1491513359 1491512639, pt 4` indicates that the first RTP packet that the Cisco ATA received was G.723.1-encoded for channel 0.

Table 6-2 Debug Log Examples (continued)

Log event	Description
[*ch*] codec: <*pt1*> => <*pt2*>	Voice codec switchover occurred. The voice encoder type switched from *pt1* to *pt2* for the channel *ch*. For example, `[0]codec: 4 => 0` indicates that the local voice encoder on the Cisco ATA switched from G.723.1 to G.711µ-law.
[*ch*] Rx MPT PT=<*NSEpt*> NSE pkt <*event*>	Channel *ch* received an NSE packet of *event* with payload type of *NSEpt*. For *event*, c0XXXXXX indicates a CED tone event, and c1XXXXXX indicates a phase reversal event. For example, `[0]Rx MPT PT=100 NSE pkt c0000000` indicates that the Cisco ATA received a CED tone event NSE packet with payload type of 100.
[*ch*] Tx MPT PT=<*pt*> NSE pkt <*event*>	Channel *ch* transmitted an NSE packet of *event* with payload type of *NSEpt*. For *event*, c0XXXXXX indicates a CED tone event, and c1XXXXXX indicates a phase reversal event. For example, `[0]Tx MPT PT=100 NSE pkt c0000000` indicates that the ATA transmitted a CED tone event NSE packet with payload type of 100.

Debugging FAX Pass-through Mode

When the Cisco ATA is configured to use *fax pass-through mode*, the fax call session can be established with an arbitrary voice codec. Once the voice call has been established, fax machines can signal their presence by means of a CED tone or V.21 preamble flag, after which the gateways send NSE packets to initiate switchover.

Note For *fax pass-through mode*, check the Cisco ATA debug log to verify that it is acting as an originating gateway as well as a terminating gateway.

Terminating-Gateway Example

When the Cisco ATA is used as a terminating gateway for a fax session, make sure the following conditions are true:

- The Cisco ATA transmits CED-tone-event NSE packets.
- The encoder switchover to G.711 occurs during the NSE-packet transaction.

An example debug log for a terminating gateway scenario is show below:

```
[0]Tx MPT PT=100 NSE pkt c0000000
[0]codec: 4 => 0
[0]Rx MPT PT=100 NSE pkt c0000000
```

Note The NSE response to the CED tone event is not mandatory; some gateways may not send back an NSE response.

Originating-Gateway Example

When the Cisco ATA is used as an originating gateway for a fax session, make sure that the following conditions are true:

- The Cisco ATA receives and responds to CED-tone-event NSE packets.
- The NSE payload type is the same for the received and transmitted NSE packets.
- The encoder switchover to G.711 occurs during NSE-packet transaction.

An example debug log for an originating gateway scenario is shown below:

```
[0]Rx MPT PT=100 NSE pkt c0000000
[0]Tx MPT PT=100 NSE pkt c0000000
[0]codec: 4 => 0
[0]Rx MPT PT=100 NSE pkt c0000000
[0]Rx MPT PT=100 NSE pkt c0000000
```

Note If your gateway is using a legacy IOS software image, it may not send NSE packets but instead may rely on a straightforward codec switchover mechanism. In this case, a codec switchover event occurs rather than an NSE packet transaction.

Possible Reasons for Failure

If your Cisco ATA does not receive CED-tone-event NSE packets and codec switchover does not occur, the failure may be due to the following reasons:

- The terminating gateway is not configured with fax/modem pass-through.
- The *fax pass-through mode* used by the terminating gateway may not be compatible with the Cisco NSE method.

If the log shows proper NSE packet transaction and G.711 upspeed for your fax session but the session still fails, check that the following conditions are true:

- The Cisco ATA software image version is 2.14 or above.
- The Cisco ATA model number is ATA186-I1, ATA186-I2, ATA188-I1, or ATA188-I2.
- The fax relay option for the remote gateways has been disabled.

Debugging FAX Mode

When the Cisco ATA is configured with *fax mode*, only G.711 codecs are used. You must confirm that only 0 (for G.711µ-law) or 8 (for G.711A-law) appear in the `Enable encoder` and `DPKT 1st` debug lines. The following example of a debug log shows that G.711µ-law is used:

```
[0]Enable encoder 0
[0]DPKT 1st: 1491513359 1491512639, pt 0
```

If the numeric codes for the G.711 codecs do not appear in the log, you need to check your **AudioMode** parameter setting on the Cisco ATA.

If the correct G.711 codecs appear in the log but your fax sessions still fail, check that the following conditions are true:

- The Cisco ATA software image version is 2.14 or above.
- The Cisco ATA model number is ATA186-I1, ATA186-I2, ATA 188-I1, or ATA188-I2.
- The fax relay option for the remote gateways has been disabled.

Using rtpcatch for Diagnosing Fax Problems

This section contains the following topics:

- rtpcatch Overview, page 6-12
- Example of rtpcatch, page 6-13
- Analyzing rtpcatch Output for Fax Sessions, page 6-16
- Using rtpcatch to Analyze Common Causes of Failure, page 6-17
- rtpcatch Limitations, page 6-19

rtpcatch Overview

rtpcatch is a tool that provides comprehensive information for a VoIP connection. The tool runs on a Microsoft Windows-based PC and is capable of parsing an output capture file from Network Associates (NAI) Sniffer Pro and identifies significant fax pass-through and fax relay events.

Major functions

rtpcatch includes the following major functions:

- Reads session data from Sniffer Pro capture files.
- Analyzes media streams.
- Stores media streams to files.
- Reports RTP statistics such as the number of RTP packets, the number of RTP frames, the number of lost packets, the number of filler packets during silence suppression periods, and the number of erased packets.

How to Use

To use **rtpcatch**, follow these steps:

Procedure

Step 1 Create a working directory for **rtpcatch** and place the executable file rtpcatch.exe in this directory.

Step 2 Copy your Network Associates Sniffer Pro capture files into this directory.

Step 3 At the DOS prompt of this directory, enter the following command:

```
:>rtpcatch <cap_file> [<prefix>] [options]
```

- **<cap_file>** is the NAI Sniffer capture file.
- **<prefix>** is the prefix prepended to the output filenames.

Output Files

The output files of **rtpcatch** include a summary file and audio stream files.

The summary file is ***<prefix>.sum*** if **<prefix>** is specified, otherwise it is ***file.sum***.

Stream files are labeled with an integer tag beginning with 00. Stream files are also tagged with the extension ***pcm*** for G.711A/G.711µ-law, ***723*** for G723.1, ***729*** for G729, ***t38*** for T.38, and ***cfr*** for Cisco Fax Relay.

Options

rtpcatch options include:

- `-fax`—to output the fax events for a connection.

  The output includes "`FAX summary 1`" as the interleaved event list for all directions, and "`FAX summary 2`" as the event list for each direction. The reported events include voice codec change, NSE signalling, and fax relay events.

- `-port <port0> <port1>`—to discard any packets sent from/to this port.

  If the NAI Sniffer capture file includes Cisco ATA **prserv** packets, these packets can interfere with **rtpcatch** analysis. Some **prserv** packets might be interpreted as NTE or NSE events. To prevent such interference, you can either disable debugging output on the Cisco ATA (do this by setting the **Nprintf** configuration parameter to 0), configure your NAI Sniffer to filter out the **prserv** packets, or run **rtpcatch** with the -port options.

Note **rtpcatch** works best for analyzing a single VoIP session. Command-line options can be entered in any order.

Example of rtpcatch

The section contains an example of using **rtpcatch** and includes an explanation of its output:

Output

```
C:\>rtpcatch faxpassthru -fax

[   25]open file: 00.723, (G723) 2.213:10000 => 2.116:10002
[   26]open file: 01.723, (G723) 2.116:10002 => 2.213:10000
[   29] <00>  1 silence pkts from TS 1760 (seq# 3)
[   42] <00>  2 silence pkts from TS 4400 (seq# 9)
[   47] <00>  2 silence pkts from TS 5600 (seq# 11)
[   55] <00>  2 silence pkts from TS 7760 (seq# 15)
[  101]open file: 02.pcm, (G711u) 2.116:10002 => 2.213:10000
[  106] <02>  2    lost pkts from seq# 39
[  107]open file: 03.pcm, (G711u) 2.213:10000 => 2.116:10002
[  110] <03>  1 silence pkts from TS 19440 (seq# 41)


------------ Summary --------------

Input file: faxpassthru.cap

<00.723>: (G723) 2.213:10000 => 2.116:10002
     total 38 pkts(70 frames), lost 0 pkts, fill 7 silence pkts

<01.723>: (G723) 2.116:10002 => 2.213:10000
     total 38 pkts(76 frames), lost 0 pkts, fill 0 silence pkts

<02.pcm>: (G711u) 2.116:10002 => 2.213:10000
     total 2181 pkts(2181 frames), lost 2 pkts, fill 0 silence pkts
```

```
<03.pcm>: (G711u) 2.213:10000 => 2.116:10002
     total 2179 pkts(2179 frames), lost 0 pkts, fill 1 silence pkts


---------- FAX Summary 1 ----------

[   25]<2.213=>2.116> Codec G723
[   26]<2.116=>2.213> Codec G723
[  101]<2.116=>2.213> Codec G711u/D
[  102]<2.116=>2.213> NSE PT 100, EVT 192: Up-Speed, CED tone Detected
[  103]<2.116=>2.213> NSE PT 100, EVT 193: ECAN OFF, Phase Reversal Detected
[  105]<2.213=>2.116> NSE PT 100, EVT 192: Up-Speed, CED tone Detected
[  107]<2.213=>2.116> Codec G711u/D

---------- FAX Summary 2 ----------

PATH: 2.213:10000 => 2.116:10002
[   25]Codec G723
[  105]NSE PT 100, EVT 192: Up-Speed, CED tone Detected
[  107]Codec G711u/D

PATH: 2.116:10002 => 2.213:10000
[   26]Codec G723
[  101]Codec G711u/D
[  102]NSE PT 100, EVT 192: Up-Speed, CED tone Detected
[  103]NSE PT 100, EVT 193: ECAN OFF, Phase Reversal Detected
```

Explanation

The output is printed on screen and saved in the file file.sum.

The following lines are described:

- `[   25]open file: 00.723, (G723) 2.213:10000 => 2.116:10002`

  This indicates that **rtpcatch** reached NAI Sniffer packet number 25 and opened a new file named 00.723 to store an audio stream consisting of G.723-compressed data. The audio path originates from the IP address ending with 2.213 and port 10000 (written as <2.213:1000>) and terminates at the IP address ending with 2.116 and port 10002.

- `[   29] <00>  1 silence pkts from TS 1760 (seq# 3)`

  This indicates that **rtpcatch** detected one silence RTP packet in the audio path <00> and the silence packet began at timestamp 1760. This occurred at packet number 29 with the RTP sequence number 3.

- `[  106] <02>  2    lost pkts from seq# 39`

  This indicates that **rtpcatch** detected two lost RTP packets in the audio path <02>. The missing packets began with sequence number 39. This occurred at packet number 106.

- `------------ Summary --------------`

  ```
  Input file: faxpassthru.cap
  <00.723>: (G723) 2.213:10000 => 2.116:10002
  total 38 pkts(70 frames), lost 0 pkts, fill 7 silence pkts
  ```

  This indicates that the input filename is faxpassthru.cap. The output file 00.723 contains the G.723-compressed stream from <2.123:10000> to <2.116:10002>; 38 packets (70 frames) were processed by **rtpcatch**. No lost packets were detected and seven silence packets were found.

- `---------- FAX Summary 1 ----------`

```
[   25]<2.213=>2.116> Codec G723
[   26]<2.116=>2.213> Codec G723
[  101]<2.116=>2.213> Codec G711u/D
[  102]<2.116=>2.213> NSE PT 100, EVT 192: Up-Speed, CED tone Detected
[  103]<2.116=>2.213> NSE PT 100, EVT 193: ECAN OFF, Phase Reversal Detected
[  105]<2.213=>2.116> NSE PT 100, EVT 192: Up-Speed, CED tone Detected
[  107]<2.213=>2.116> Codec G711u/D
```

This indicates that the audio streams originating at <2.213> and <2.216> are G.723-compressed. The audio stream from <2.116> was then up-sped to G.711µ-law at packet number 101. The NSE signaling packets were sent at packet number 102, 103 and 105. Finally, the audio stream from <2.113> was up-sped to G.711µ-law.

- ---------- FAX Summary 2 ----------

```
PATH: 2.213:10000 => 2.116:10002
[   25]Codec G723
[  105]NSE PT 100, EVT 192: Up-Speed, CED tone Detected
[  107]Codec G711u/D
PATH: 2.116:10002 => 2.213:10000
[   26]Codec G723
[  101]Codec G711u/D
[  102]NSE PT 100, EVT 192: Up-Speed, CED tone Detected
[  103]NSE PT 100, EVT 193: ECAN OFF, Phase Reversal Detected
```

This summarizes the fax events for each path.

The audio stream events reported by **rtpcatch** include:

- beginning of new audio codec
- silence packets
- lost packets
- erased packets (as in G.729)

The NSE events reported by **rtpcatch** include:

- event 32, Fax Mode, CED tone Detected (RFC2833)
- event 34, Modem Mode, ANSam tone Detected (RFC2833)
- event 192, Up-Speed, CED tone Detected
- event 193, ECAN OFF, Phase Reversal Detected
- event 194, ECAN ON, Silence Detected
- event 200, T38 Fax Mode, V.21 Detected
- event 201, T38 Fax Mode ACK
- event 202, T38 Fax Mode NACK
- event 203, Modem Relay Mode, CM Tone Detected
- event Cisco Fax Relay (with RTP payload type 96)
- event Cisco Fax Relay ACK (with RTP payload type 97)

Analyzing rtpcatch Output for Fax Sessions

The following examples show the proper fax events when gateways are configured to operate in the following modes:

- Cisco ATA *fax mode*
- Cisco ATA *fax pass-through mode*
- T.38 fax relay mode
- Cisco fax relay mode

Example 6-1 Fax Mode

```
---------- FAX Summary 1 ----------
[   25]<2.131=>3.200> Codec G711u
[   26]<3.200=>2.131> Codec G711u
```

Analysis

Both sides use G.711 for the entire fax session.

Example 6-2 Fax Pass-through Mode

```
---------- FAX Summary 1 ----------
[   25]<2.213=>2.116> Codec G723
[   26]<2.116=>2.213> Codec G723
[  101]<2.116=>2.213> Codec G711u/D
[  102]<2.116=>2.213> NSE PT 100, EVT 192: Up-Speed, CED tone Detected
[  103]<2.116=>2.213> NSE PT 100, EVT 193: ECAN OFF, Phase Reversal Detected
[  105]<2.213=>2.116> NSE PT 100, EVT 192: Up-Speed, CED tone Detected
[  107]<2.213=>2.116> Codec G711u/D
```

Analysis

- Both sides initially use G.723.
- <2.116> switches to G.711µ-law using a dynamic payload type.
- NSE signaling packets are sent from <2.116>.
- An optional NE signaling packet is sent from <2.213>.
- <2.113> switches to G.711µ-law using a dynamic payload type.

Note EVT 193 may not appear for some fax transmission.

Example 6-3 Fax Pass-through Mode

```
---------- FAX Summary 1 ----------
[   37]<3.200=>2.53> Codec G723
[   41]<2.53=>3.200> Codec G723
[  136]<3.200=>2.53> Codec G711u/D
[  137]<3.200=>2.53> NSE PT 100, EVT 192: Up-Speed, CED tone Detected
[  140]<2.53=>3.200> Codec G711u/D
```

Analysis

- Both sides initially use G.723.
- <3.200> switches to G.711µ-law using a dynamic payload type.

- NSE signaling packets are sent from <3.200>.
- <2.53> switches to G.711µ-law using a dynamic payload type.

Example 6-4 T38 Fax Relay Mode

```
---------- FAX Summary 1 ----------
[   15]<2.53=>3.99> Codec G711u
[  486]<3.99=>2.53> Codec G711u
[ 1277]<3.99=>2.53> Codec T38
[ 1278]<2.53=>3.99> Codec T38
```

Analysis

- Both sides initially use G.711µ-law.
- Both sides switch to T.38

Example 6-5 Cisco Fax Relay

```
---------- FAX Summary 1 ----------
[    8]<2.53=>3.99> Codec G711u
[  248]<3.99=>2.53> Codec G711u
[  798]<2.53=>3.99> NSE PT 96, Cisco Fax Relay
[  799]<3.99=>2.53> NSE PT 97, EVT 192: Up-Speed, CED tone Detected
[  800]<2.53=>3.99> NSE PT 97, Cisco Fax Relay ACK
[  801]<2.53=>3.99> Codec C_FxRly
[  803]<3.99=>2.53> NSE PT 96, EVT 192: Up-Speed, CED tone Detected
[  804]<2.53=>3.99> NSE PT 97, Cisco Fax Relay ACK
[  805]<3.99=>2.53> Codec C_FxRly
```

Analysis

- Both sides initially use G.711µ-law.
- NSE signaling packets are sent between <2.53> and <3.99>.
- Both sides switch to Cisco fax relay.

Using rtpcatch to Analyze Common Causes of Failure

The following examples show the **rtpcatch** output of failed fax sessions. <3.200> is ATA; <2.53> is a Cisco gateway.

Example 6-6 Cisco ATA Configuration Failure

```
---------- FAX Summary 1 ----------
[   37]<2.53=>3.200> Codec G723
[   39]<3.200=>2.53> Codec G723
```

Analysis

- <2.53> is the originating gateway and <3.200> is the terminating Cisco ATA.
- The Cisco ATA and the <2.53> gateway use G.723 codec.

Possible Causes for Failure

- The Cisco ATA is not configured with *fax mode* or *fax pass-through mode*.
- If the Cisco ATA is the gateway for a fax sender, the remote gateway is not configured with *fax pass-through mode*.

Example 6-7 Fax Mode Failure

```
---------- FAX Summary 1 ----------
[   37]<2.53=>3.200> Codec G711
[   39]<3.200=>2.53> Codec G711
[ 1820]<2.53=>3.200> NSE PT  96, Cisco Fax Relay
[ 1966]<2.53=>3.200> NSE PT  96, Cisco Fax Relay
```

Analysis

- <2.53> is the originating gateway and <3.200> is the terminating Cisco ATA.
- The Cisco ATA and the <2.53> gateway begin with G.711 codec.
- The <2.53> gateway sends Cisco fax relay event packets.

Possible Cause for Failure

- Cisco fax relay option is not disabled on the gateway.

Example 6-8 Fax Pass-through Mode Failure

```
---------- FAX Summary 1 ----------
[    2]<2.53=>3.200> Codec G723
[    4]<3.200=>2.53> Codec G723
[  106]<3.200=>2.53> Codec G711u/D
[  107]<3.200=>2.53> NSE PT 100, EVT 192: Up-Speed, CED tone Detected
[ 1436]<3.200=>2.53> NSE PT 100, EVT 192: Up-Speed, CED tone Detected
```

Analysis

- <2.53> is the originating gateway, and <3.200> is the terminating Cisco ATA.
- The Cisco ATA upspeeds to G.711µ-law and sends G.711 upspeed NSE signaling packets.
- The <2.53> gateway does not respond to the NSE signaling packets.

Possible Causes for Failure

- Fax/modem pass-through option is not enabled on the gateway.
- Fax/modem pass-through NSE payload type are configured differently on the Cisco ATA and the gateway.

Example 6-9 Fax Pass-through Mode Failure

```
---------- FAX Summary 1 ----------
[   37]<2.53=>3.200> Codec G723
[   39]<3.200=>2.53> Codec G723
[  143]<3.200=>2.53> Codec G711u/D
[  144]<3.200=>2.53> NSE PT 100, EVT 192: Up-Speed, CED tone Detected
[ 1602]<3.200=>2.53> NSE PT 100, EVT 192: Up-Speed, CED tone Detected
[ 1604]<2.53=>3.200> Codec G711u/D
[ 1820]<2.53=>3.200> NSE PT  96, Cisco Fax Relay
[ 1966]<2.53=>3.200> NSE PT  96, Cisco Fax Relay
```

Analysis

- <2.53> is the originating gateway, and <3.200> is the terminating Cisco ATA.
- The Cisco ATA upspeeds to G.711µ-law and sends G.711 upspeed NSE signaling packets.
- The <2.53> gateway upspeeds to G.711µ-law and then sends Cisco fax relay event packets.

Possible Cause for Failure

- Cisco fax relay option is not disabled on the gateway.

Example 6-10 Fax Pass-through Mode Failure

```
---------- FAX Summary 1 ----------
[   33]<3.200=>2.53> Codec G729
[   39]<2.53=>3.200> Codec G729
[  562]<2.53=>3.200> NTE PT 101, EVT  34: Modem Mode, ANSam tone Detected (RFC2833)
[  563]<2.53=>3.200> NTE PT 101, EVT  34: Modem Mode, ANSam tone Detected (RFC2833)
[  565]<2.53=>3.200> NTE PT 101, EVT  34: Modem Mode, ANSam tone Detected (RFC2833)
[  566]<2.53=>3.200> Codec G711u/D
[  568]<2.53=>3.200> NTE PT 101, EVT  34: Modem Mode, ANSam tone Detected (RFC2833)
[  580]<3.200=>2.53> Codec G711u/D
```

Analysis

- <3.200> is the originating Cisco ATA, and <2.53> is the terminating gateway.
- Both sides initially use G.729.
- <2.53> gateway sends NTE signaling packets, then upspeeds to G.711µ-law.
- <3.200>The Cisco ATA switches to G.711µ-law also, but never sends NTE signaling packets.
- Fax transmission fails because <2.53> gateway does not receive any NTE packets, and it drops the fax call.

Possible Cause for Failure

- The Cisco ATA does not support the NTE signaling method and requires that the gateways use the NSE signaling method.

rtpcatch Limitations

- **rtpcatch** performs optimally when analyzing capture files containing only one VoIP session.
- **rtpcatch** detects only G.711A, G.711µ-law, G.723, G.729, T.38, Cisco fax relay, modem pass-through with or without redundancy packets, RTCP packets and NSE packets.
- **rtpcatch** can handle a maximum of 20 prserv ports using the -port option.
- **rtpcatch** may not detect T.38 packets correctly.

Upgrading the Cisco ATA Signaling Image

This section describes two methods for upgrading the Cisco ATA software for the SCCP protocol:

- Upgrading the Signaling Image Via Cisco CallManager, page 7-2—This is the Cisco-recommended method for the SCCP protocol. This method is the most efficient method and requires no configuration-file changes.
- Upgrading the Signaling Image Manually, page 7-4—This method can be used if you want to manually upgrade the image of one Cisco ATA. However, this method is not recommended in the Cisco CallManager environment because of configuration changes that are required before and after performing the upgrade.

This section also describes procedures for verifying a successful image upgrade:

- Confirming a Successful Signaling Image Upgrade, page 7-6—Procedures for using your Web browser or the voice configuration menu are included.

Note If the Cisco ATA is loaded with a SCCP image version earlier than ata186-v2-15-ms-020911b and has registered to a Cisco CallManager, upgrading the SCCP image to ata186-v2-15-ms-02911b or later may cause the Cisco CallManager to show a "Not Registered" status. This status may appear even if the Cisco ATA has successfully completed the registration process. In this scenario, you must restart the Cisco CallManager to update the to the proper Cisco ATA registration status. (For more information, see the “Restarting the Cisco CallManager” section on page 8-4.)

Caution Do not unplug the Cisco ATA while the function button is blinking. Doing so can cause permanent damage to the device. The function button blinks during an upgrade.

Note The term *Cisco ATA* is used throughout this manual to refer to both the Cisco ATA 186 and the Cisco ATA 188, unless differences between the Cisco ATA 186 and Cisco ATA 188 are explicitly stated.

Upgrading the Signaling Image Via Cisco CallManager

This feature is supported in Cisco CallManager version 3.2 or later and is the Cisco-recommended method for SCCP. The following requirements must be met:

- XML support must be turned on in the Cisco ATA (default is **on**). XML support is configured with Bit 31 of the ConnectMode parameter (see the "ConnectMode" section on page 5-13).
- This procedure can only be performed by the Cisco CallManager administrator.

Obtain the latest signaling image from the Cisco web site. See the "Setting Up the TFTP Server with Cisco ATA Software" section on page 3-8 for instructions on where to find the software on the Cisco web site and how to place the files onto the Cisco CallManager TFTP server. The image file has the extension of .zup.

This section contains procedures for two different scenarios:

- Procedure for Upgrading all Cisco ATAs at Once, page 7-2
- Procedure for Upgrading One Cisco ATA, page 7-3

Procedure for Upgrading all Cisco ATAs at Once

Step 1 Download the latest Cisco ATA release software for SCCP from the Cisco web site, and store the files on the Cisco CallManager TFTP server. For more information, see the "Setting Up the TFTP Server with Cisco ATA Software" section on page 3-8.

Step 2 Go to the main Cisco CallManager Administration screen.

Step 3 From the System pull-down menu, select **Device Defaults**. The Device Defaults screen appears.

Step 4 In the Device Type list, find the device type **Cisco ATA 186**. In the Load Information field next to the device type of Cisco ATA 186, enter the name of the signaling image (the signaling image has an extension of .zup, for example, ATA186-v2-15-ms-020812a.zup) to use for upgrading the Cisco ATAs.

Step 5 Press the **Update** button at the top of the Device Defaults screen.

Step 6 From the Device pull-down menu, select **Phone**. The Find and List Phones screen appears.

Step 7 In the area next to the Find button, enter the letters "ata", then press **Find**. The Find and List Phones screen reappears, and now contains all the Cisco ATAs connected to your Cisco CallManager.

Step 8 Check the box to the left of the Device Name column (above all listed devices) to select all the Cisco ATAs shown.

Step 9 Click the **Reset Selected** button at the bottom of the Find and List Phones screen.

Step 10 The Reset Device pop-up window appears. Click **Reset Device**. The Reset Device popup window appears. Click **Reset** to complete the procedure.

Step 11 A confirmation box appears. Click **OK**.

The function button on each Cisco ATA blinks during its upgrade. Once the button stops blinking, the upgrade is complete and the device re-registers to the Cisco CallManager.

Procedure for Upgrading One Cisco ATA

Step 1 Download the latest Cisco ATA release software for SCCP from the Cisco web site, and store the files on the Cisco CallManager TFTP server. For more information, see the "Setting Up the TFTP Server with Cisco ATA Software" section on page 3-8.

Step 2 Go to the main Cisco CallManager Administration screen.

Note Before continuing this procedure, make sure that the Load Information field for the Cisco ATA 186 Device Type is set to 0 on the Device Defaults screen (**System > Device Defaults**).

Step 3 From the Device pull-down menu, select **Phone**. The Find and List Phones screen appears.

Step 4 In the area next to the Find button, enter a portion or all of the Cisco ATA MAC address, then press **Find**. The Find and List Phones screen reappears, and now contains the Cisco ATAs that match the find criteria you entered in the previous screen.

Step 5 Click the icon of the Cisco ATA whose signaling image you would like to upgrade. The Phone Configuration screen appears.

Step 6 In the Phone Load field, enter the name of the signaling image (the signaling image has an extension of .zup, for example, ATA186-v2-15-ms-020812a.zup).

Step 7 Press **Update**.

Step 8 You will receive a message that you should reset the device. Click **OK**.

Step 9 Click the **Reset Phone** button on the Phone Configuration screen.

Step 10 The Reset Device pop-up window appears. Click **Reset**.

Step 11 A confirmation box appears. Click **OK**.

The function button on the Cisco ATA blinks during the upgrade. Once the button stops blinking, the upgrade is complete and the device re-registers to the Cisco CallManager.

Upgrading the Signaling Image Manually

This section describes how to manually upgrade the Cisco ATA with the most recent signaling image. The executable file that you need is called ata186us.exe, and is bundled in the Cisco ATA release-software zip file.

You should use this procedure only if the Cisco CallManager IP address or URL has been statically configured with the CA0orCM0 or CA1orCM1 parameters (see the "CA0orCM0 and CA1orCM1" section on page 5-9).

This section contains the following topics:

- Preliminary Steps, page 7-4
- Running the Executable File, page 7-4

Preliminary Steps

Before you run the executable file, be sure to complete the following procedure:

Procedure

Step 1 If you are a registered CCO user. go to the following URL:
http://www.cisco.com/cgi-bin/tablebuild.pl/ata186

Step 2 Locate the zip file that contains the software for the applicable release and signaling image you are using. The contents of each file are described next to the file name. Extract the signaling image file (this file has an extension of .zup—For example, ata186-v2-15-020723a.zup) and store it on the PC that has connectivity with the Cisco ATA.

Step 3 Set the Cisco ATA parameter UseTftp to 0.

Note Remember to set this parameter back to 1 before you use the Cisco CallManager upgrade method at a later time.

Step 4 (For Cisco Call Manager version 3.2 or later) In the Cisco CallManager Phone Configuration screen for the Cisco ATA whose image you are upgrading, set the Phone Load field to **NONE**.

Step 5 Follow the instructions in the "Running the Executable File" section on page 7-4.

Running the Executable File

This section includes the procedure for running the executable file and using the voice configuration menu to complete the upgrade process. First check to make sure the upgrade requirements are met and determine the syntax to use when running the program.

This section contains the following topics:

- "Upgrade Requirements" section on page 7-5
- "Syntax" section on page 7-5
- "Upgrade Procedure" section on page 7-5

Upgrade Requirements

The following list contains the requirements for using the ata186us.exe file and the voice configuration menu to upgrade the Cisco ATA to the latest signaling image:

- A network connection between the PC from which you will invoke the executable file and the Cisco ATA
- A PC running Microsoft Windows 9X/ME/NT/2000

Syntax

`ata186us [-any]` {-h[host_ip]} {-p[port]} {-quiet} [-d1 -d2 -d3] <image file>

Definitions

- `-any`—Allow upgrade regardless of software and build versions (recommended).
- `-h[host_ip]`—Set the upgrade server to a specific IP address in cases where there may be more than one IP address for the host. The default behavior is that the program will use the first IP address it obtains when it runs the **gethostbyname** command.
- `-p[port]`—Set the server port to a specific port number (the default port number is 8000; use a different port number only if you are setting up an upgrade server other than the default).
- `-quiet`—Quiet mode; send all output to log file named as [port].log (useful when running the upgrade server as a daemon).
- `-d1,-d2,-d3`—Choose a verbosity level for debugging, with -d3 being the most verbose.
- image file—This is the name of the signaling image file to which the Cisco ATA will upgrade.

Example

To upgrade the Cisco ATA to the signaling image ata186-v2-15-020723a.zup, you can use the following syntax:

ata186us -any -d1 ata186-v2-15-020723a.zup

Upgrade Procedure

To perform the upgrade, follow these steps:

Procedure

Step 1 Run the executable file (see the "Syntax" section on page 7-5) from the Microsoft Windows DOS or command prompt. You will receive instructions on how to upgrade.

Step 2 On the Cisco ATA, press the function button to invoke the voice configuration menu.

Step 3 Using the telephone keypad, enter the following:

100# *ip_address_of_PC* * port #

This is the IP address of the PC and the port number at the DOS prompt where you invoked the ata186us.exe file.

For example, if the IP address is 192.168.1.10, and the port number is 8000 (the default), then enter:

100#192*168*1*10*8000#

When the upgrade is complete, the "Upgrade Successful" prompt will sound.

Note When upgrading many Cisco ATAs manually, you can save the software-upgrade dial-pad sequence in your telephone's speed-dial, and use this sequence repeatedly.

Confirming a Successful Signaling Image Upgrade

You can verify that you have successfully upgraded the Cisco ATA signaling image by using one of the following methods:

- Using a Web Browser, page 7-6
- Using the Voice Configuration Menu, page 7-7

Using a Web Browser

To use your web browser to verify a successful image upgrade, perform the following steps:

Procedure

Step 1 Open your web browser.

Step 2 Enter the IP address of your Cisco ATA Web configuration page:

http://<*IP address*>/dev

Step 3 Refresh the page to clear the cache.

The image version number and its build date should appear at the bottom-left corner of the Cisco ATA Web configuration page.

Using the Voice Configuration Menu

To use the voice configuration menu to verify a successful image upgrade, perform the following steps:

Procedure

Step 1 Pick up the telephone handset attached to the **Phone1** port of the Cisco ATA.

Step 2 Press the function button on the Cisco ATA.

Step 3 Press **123#** on the telephone keypad to play out the image version number.

Press **123123#** on the telephone keypad to play out the image build date.

Troubleshooting

This section describes troubleshooting procedures for the Cisco ATA:

- General Troubleshooting Tips, page 8-1
- Symptoms and Actions, page 8-2
- Installation and Upgrade Issues, page 8-3
- Restarting the Cisco CallManager, page 8-4
- Debugging, page 8-5
- Frequently Asked Questions, page 8-6
- Contacting TAC, page 8-8

Note The term *Cisco ATA* is used throughout this manual to refer to both the Cisco ATA 186 and the Cisco ATA 188, unless differences between the Cisco ATA 186 and Cisco ATA 188 are explicitly stated.

General Troubleshooting Tips

The suggestions in this section are general troubleshooting tips.

- Make sure that the DHCP server is operating correctly. Note that the function button blinks slowly when the Cisco ATA attempts to acquire the DHCP configuration.
- If the green activity LED is not flashing after you connect the Ethernet cable, make sure that both the power cord and the Ethernet connection are secure.
- If there is no dial tone, make sure that the telephone line cord from the telephone is plugged into the appropriate port on the Cisco ATA. Make sure that your Cisco ATA is properly registered on your Call Control system. Test another phone; if this phone does not work either, there may be a problem with the current configuration or with the Cisco ATA.
- A busy tone indicates that the party you called is not available. Try your call again later. A fast-busy tone indicates that you dialed an invalid number.
- After power up, if the function button continues to blink slowly, the Cisco ATA cannot locate the DHCP server. Check the Ethernet connection and the availability of the DHCP server.
- The DHCP server should show an incoming request from the MAC address listed on the product label or given by the voice prompt.

Symptoms and Actions

Symptom Parameters with values set by using the web server interface or voice configuration menu revert to their original settings.

Possible Cause You are using TFTP for configuration (UseTFTP parameter is set to 1). The Cisco ATA has a cached version of its configuration file stored in its flash memory; this is what displayed or played through the web server interface or voice configuration menu. If UseTFTP is set to 1, then the cached value of its configuration file is synchronized with its configuration file located at the TFTP server.

Recommended Action If you are using TFTP for configuration, do not use the web server interface or voice configuration menu to modify the value of the Cisco ATA configuration file. Use the web server interface or voice configuration menu only to initially configure the Cisco ATA to use TFTP for configuration.

Symptom Unable to access the web configuration page.

Possible Cause Software versions earlier than 2.0 require the web configuration page to be enabled using option 80# on the voice configuration menu.

Recommended Action Upgrade the software.

Symptom The Cisco ATA does not seem to be configured using the TFTP server.

Possible Cause TFTP server address is not properly set.

Recommended Action Ensure that the TftpURL is correctly set to the URL or IP address of the TFTP server that is hosting the configuration file for the Cisco ATA. If you are using DHCP to supply the TFTP server IP address, make sure that the TftpURL is set to 0. Also, unless the TftpURL is an IP address, be sure that the DNS1IP and DNS2IP values are properly set to resolve the TftpURL supplied by DHCP.

Symptom Two records of a Cisco ATA registration—one **Cisco ATA 186** record and one **Cisco 7960 record**—are shown on the Cisco CallManager.

Possible Cause Backward compatibility requirements cause a Cisco ATA to attempt to register as both a **Cisco ATA 186** and a **Cisco 7960** device type.

Recommended Action Upgrade the Cisco ATA signaling image to a version number of 2.15 or later.

Symptom Cannot place call.

Possible Cause Equipment failure on the network.

Recommended Action Replace defective network equipment.

Possible Cause Recipient has not registered the IP phone.

Recommended Action Register the IP phone.

Possible Cause Ethernet cable is not connected.

Recommended Action Make sure that all cables are connected.

Installation and Upgrade Issues

Symptom The red LED is flashing slowly on the function button.

Possible Cause The Cisco ATA is trying to obtain the DHCP address or the software image is being upgraded.

Possible Cause The Ethernet cable is unplugged.

Recommended Action Plug in the Ethernet cable.

Symptom Voice prompt returns *Upgrade not available* message. This can only occur if you are using the executable-file upgrade method.

Possible Cause You are attempting to upgrade to the existing version.

Recommended Action You do not need to upgrade.

Symptom After you upgrade the Cisco ATA to a new signaling image, you receive an incorrect "Not Registered" status from the Cisco CallManager.

Possible Cause The Cisco CallManager is unable to properly process the registration change after the Cisco ATA upgrades its image from a version prior to the ata186-v2-15-ms-020911b image.

Recommended Action Follow the procedure in the “Restarting the Cisco CallManager” section on page 8-4.

Symptom Voice prompt returns *Upgrade failed* message. This can only occur if you are using the executable-file upgrade method.

Possible Cause You have entered an incorrect IP address.

Recommended Action Enter the correct IP address.

Possible Cause Software image is corrupted.

Recommended Action Upgrade software image.

Symptom No dial tone.

Possible Cause No user ID was entered.

Recommended Action Enter the correct user ID.

Symptom Incorrect dial tone.

Possible Cause Check the web interface for your DialTone setting. The default is *U.S.*

Recommended Action Set the correct country DialTone value.

Restarting the Cisco CallManager

If you need to restart the Cisco CallManager after a signaling image upgrade, follow the steps below:

Procedure

Step 1 Open your web browser

Step 2 Access the CallManager administration page:

http://<*IP address*>/ccmadmin

Step 3 From the Application menu, select **Cisco CallManager Serviceability**.

Step 4 From the Tools menu, **Control Cente**r.

Step 5 From the Servers list, choose the applicable Cisco CallManager. Select only the Cisco CallManager from the list.

Step 6 Click the **Restart** button if available. If this button is not available, click **Stop** then click **Start**.

Debugging

The MS-DOS Windows-based debugging program tool, preserv.exe, is included in every software upgrade package. The tool is also available from Cisco TAC. The prserv program is used in conjunction with the NPrintf configuration parameter (see the "NPrintf" section on page 5-26). This file serves as an upgrade server that captures debug information sent by the Cisco ATA software to your PC's IP address and port number. This debug file (prserv.exe) compiles the information from the Cisco ATA into a readable log file. To capture this NPrintf information, you must know the IP address of the PC using the prserv program, illustrated as follows:

```
IP address.port
```

where *IP address* is the IP address of your PC, and *port* is 9001. If another process on your PC already uses port 9001, you may use some other value (legal values are from 1024 to 65535). If no port value is entered, the default value is 9001.

To enter the IP address and port number, use voice menu option 81#. You must enter the IP address and port number in alphanumeric format, which requires entering the * key after every character entered. To enter the "." character, you must enter the sequence 1 1#.

For example, for a computer with the IP address 172.28.78.90 and port number 9001 (172.28.78.90.9001), you would enter the following on your telephone handset:

1* 7* 2* 1 1* 2* 8* 1 1* 7* 8* 1 1* 9* 0* 1 1* 9* 0* 0* 1* *

To operate the debug capture program *prserv.exe*, place the prserv program in a folder on your PC; then at the DOS prompt of the folder where you have placed it, enter:

```
C:> prserv port.log
```

where *port* is the port number you have selected. If you do not enter *port*.**log**, debug information still appears on your screen, but it is not saved to a log file.

After you finish capturing debug information, you can stop the log program by entering Ctrl-C at the DOS prompt. The log file created is named ***port*.log.** If you restart the process without changing the name of the log file, any new debug information is appended to the end of the original file.

Contact Cisco TAC for more information. See the "Obtaining Technical Assistance" section on page xiv for instructions.

You should also have access to a sniffer or LAN analyzer.

Caution For security reasons, Cisco recommends that you do not use the web interface over the public network. Disable the web interface, using the UIPassword parameter, before the Cisco ATA is moved from the service provider site.

Frequently Asked Questions

Q. How can I recover the box if I forgot the password?

A. There are two important passwords. One is the UIPassword, which protects access to the Cisco ATA Web Server interface; the other is the EncryptKey, which protects access to the TFTP configuration file. If you forget the value for the UIPassword but still have access to TFTP-stored configuration file, you can modify the UIPassword via TFTP. However, if you are not configuring the Cisco ATA via TFTP, or if you forget both passwords, the only way you can recover the box is to have physical access to the box and do a factory reset on the box via the box voice configuration menu interface (Access Code: FACTRESET#).

Q. What is the maximum distance from which I can drive an analog device with a Cisco ATA?

A. Table 8-1 provides maximum distances for this question.

Table 8-1 Ring Loads and Distances

Ring Load (per RJ-11 FXS Port)	Maximum Distance
5 REN	200 feet (61 m)
4 REN	1000 feet (305 m)
3 REN	1700 feet (518 m)
2 REN	2500 feet (762 m)
1 REN	3200 feet (975 m)

Cisco ATA, however, is not designed for long-distance usage. The simple test is to determine if the phone or phones that are connected to the Cisco ATA work properly in their environment.

Pay attention to the following questions:

1. Can the Cisco ATA detect on/off hook from the analog phone?
2. Can the Cisco ATA detect the DTMF signal?
3. Can you dial the remote side?
4. Can the Cisco ATA ring the phone?
5. Is voice quality satisfactory?

If you answer no to any of the above questions, you may have a loop impedance greater than 400 ohm. In this case, perform the following procedure.

Procedure

Step 1 Increase the wire gauge to reduce the impedance until the Cisco ATA can detect on/off hook and DTMF signal.

Step 2 If the Cisco ATA cannot ring the phone, find a phone that can ring at a lower ringing voltage. Also, try to use only one phone instead of multiple phones in parallel.

Q. Does the Cisco ATA support network address translation (NAT) when it is loaded with an SCCP image?

A. No, NAT is not supported by the Cisco ATA with the SCCP image.

Q. Can I change the RTP frame size of voice codecs for the Cisco ATA when using with SCCP image?

A. Yes. The RTP frame size is controlled by the Cisco CallManager when the Cisco ATA uses the SCCP image. To change the RTP frame size for a voice codec, follows the steps below:

Procedure

Step 1 Open your web browser

Step 2 Access the CallManager administration page:

http://<*IP address*>/ccmadmin

Step 3 From the Service menu, select **Service Parameters**.

Step 4 From the Server drop-down list, select the Cisco CallManager for the Cisco ATA.

Step 5 From the Service drop-down list, select **Cisco CallManager**.

Step 6 On the Service Parameters Configuration screen, locate the category for the Preferred G711/G723/G729 Millisecond PacketSize menu. From the corresponding drop-down list, select the RTP packet size for the G.711/G.723/G.729 voice codec.

Q. Can I enable/disable silence suppression for G.711/G.723/G.729 for the Cisco ATA when using the SCCP image?

A. Yes. If the Cisco ATA silence suppression configuration bit (AudioMode Bit 1) is available in this version of the SCCP signaling image, you should always set this bit to a value of 1. The Cisco CallManager will then control silence suppression for the voice codec. To change the silence suppression option, follows the steps below:

Procedure

Step 1 Open your web browser

Step 2 Access the Cisco CallManager administration page:

http://<*IP address*>/ccmadmin

Step 3 From the Service menu, select **Service Parameters**.

Step 4 From the Server drop-down list, select the Cisco CallManager for the Cisco ATA.

Step 5 From the Service drop-down list, select **CiscoCallManager**.

Step 6 On the Service Parameters Configuration screen, locate the category for System Wide Silence Suppression. From the corresponding drop-down list, select **True** to enable silence suppression or select **False** to disable silence suppression.

Contacting TAC

Qualified customers who need to contact the Cisco Technical Assistance Center (TAC) must provide the following information:

- Product codes.
- Software version number—To identify the software revision number, use the configuration menu number **123**.
- Software build information—To identify the software build information, use the voice menu option **123123**.
- Cisco ATA serial number.
- Hardware version number—To identify the hardware revision number, use the serial number and MAC address found on the label on the bottom of the Cisco ATA. The MAC address can also be obtained using voice menu option 24.

For instructions on contacting TAC, see the "Obtaining Technical Assistance" section on page xiv.

Note Customers who obtained their equipment through service providers, independent dealers and other third parties must contact their equipment provider for technical assistance.

How to Use Pre-call and Mid-call Services

This section contains end-user procedures for pre-call services and mid-call services that the Cisco ATA supports for the SCCP protocol.

Note The Cisco ATA administrator should provide these procedures to the end user.

This section contains the following topics:

- Procedures for Using Pre-call Services, page A-1
- Procedures for Using Mid-call Services, page A-4

Note The services listed in this section are supported by Cisco CallManager. For Cisco IOS Telephony Service (ITS)-supported services, refer to ITS documentation.

Procedures for Using Pre-call Services

The following list contains the pre-call services that the Cisco ATA (SCCP protocol) supports:

- Access Voicemail, page A-1
- Activate Call-Forward-All, page A-2
- Cancel Call-Forward-All, page A-2
- Redial, page A-2
- Speed Dial, page A-2
- Call Pickup, page A-3
- Group Call Pickup, page A-3
- MeetMe Conference, page A-3

Access Voicemail

To access your voice-mail box, press ***** then **0** on your telephone keypad.

Activate Call-Forward-All

Use this feature to send all calls from one telephone number to another telephone number. To activate Call-Forward-All, follow these steps:

Procedure

Step 1 Press ****** then **1** on your telephone keypad. You will receive a confirmation tone.

Step 2 Enter the telephone number to which you want to send the calls. A confirmation tone will sound.

Step 3 Hang up.

Cancel Call-Forward-All

To cancel Call-Forward-All, follow these steps:

Procedure

Step 1 Press ****** then **2** on your telephone keypad. You will receive a confirmation tone.

Step 2 Hang up.

Redial

Use this feature to call the last number dialed. To activate Redial, press ***** then **#** on your telephone keypad.

Speed Dial

To use Speed Dial, follow these steps:

Procedure

Step 1 Preset speed-dial commands by using the Cisco CallManager web page. (See Cisco CallManager documentation for more information.) The Cisco ATA supports nine speed-dial numbers.

Step 2 To activate speed dialing, press ***** then a digit from one to nine on your telephone keypad, as shown in the following examples:

- **Press *** then **1** to activate speed dial 1
- **Press *** then **2** to activate speed dial 2
- **Press *** then **3** to activate speed dial 3

Call Pickup

To answer a phone in your call pickup group, follow these steps:

Procedure

Step 1 Pick up the handset, press ****** then **3** on your telephone keypad. The caller ID appears and the call-waiting tone rings.

Step 2 Perform a hookflash to answer the call.

Group Call Pickup

To answer a phone outside your call pickup group, follow these steps:

Procedure

Step 1 Pick up the handset, press ****** then **4** on your telephone keypad.

Step 2 When prompted, enter the group number. The caller ID appears and the call-waiting tone rings.

Step 3 Perform a hookflash to answer the call.

MeetMe Conference

To use this feature, follow these steps:

Procedure

Step 1 Pick up the handset, press ****** then **5** on your telephone keypad. You are prompted to enter a MeetMe Conference number to reserve a conference.

Step 2 When someone dials the MeetMe Conference number, you receive a confirmation tone and can begin conferencing with the caller.

Procedures for Using Mid-call Services

The method of initiating and using mid-call services during a call when using SCCP differs according to mode, which is configured by the Cisco ATA administrator using the ConnectMode parameter (see the "ConnectMode" section on page 5-13). Use the procedures for the mid-services mode that is configured on your Cisco ATA.

The following three modes are used for invoking mid-call services:

- Bellcore Style, page A-4
- Cisco VG248 Style, page A-5
- Cisco ATA Style, page A-6

Bellcore Style

The following two procedures are unique to the Bellcore (default) style:

- Bellcore Style Call Transfer Procedure, page A-4
- Bellcore Style Conference Call Procedure, page A-4

Bellcore Style Call Transfer Procedure

Step 1 Perform a hookflash to place the current call on hold and obtain a second dial tone.

Step 2 At the dial tone, enter the telephone number or speed dial of the third party and wait for the call to ring.

Step 3 You have the following options:

- To transfer the call, hang up when the call rings or when the third party answers.
- To return to the original call, perform a hookflash before the call rings. If you perform a hookflash before the third party answers but after the call rings, you also return to the original call.

Bellcore Style Conference Call Procedure

Step 1 Perform a hookflash to place the current call on hold and obtain a second dial tone.

Step 2 At the dial tone, enter the telephone number or speed dial of the third party and wait for the call to ring.

Step 3 You have the following options:

- To add the party to a conference, perform a hookflash after the third party answers.
- To return to the original call, perform a hookflash before the call rings. If you perform a hookflash before the third party answers but after the call rings, you also return to the original call.

Cisco VG248 Style

There following three procedures are unique to Cisco VG248 style:

- Cisco VG248 Style Three-way Calling Procedure, page A-5
- Cisco VG248 Call Transfer Procedure, page A-5
- Cisco VG248 Conference Call Procedure, page A-6

Cisco VG248 Style Three-way Calling Procedure

Step 1 Perform a hookflash to place the current call on hold and obtain a second dial tone.

Step 2 Enter the telephone number or speed dial of the third party and wait for an answer. If you hang up before the third party answers, the new call is dropped. If the original caller is still holding, the telephone rings. If you perform a hookflash again before the third party answers, the new call is dropped and the original call resumes.

Step 3 After the third party answers, you can perform a hookflash to obtain a third dial tone. You now have the following options:

a. To switch to the other party, perform a hookflash. You can then switch back and forth.

b. To maintain the current state, press any other digit or let a time out occur (in four seconds by default).

Step 4 If you hang up while talking to one of the remote parties, you end the currently active call. However, if the other remote party is still holding, your phone will ring. If the previously active party has hung up, you can answer your phone and resume your conversation with the holding party.

Cisco VG248 Call Transfer Procedure

Step 1 Perform a hookflash to place the current call on hold and obtain a second dial tone.

Step 2 Enter the telephone number or speed dial of the third party and wait for an answer. If you hang up before the third party answers, the new call is dropped. If the original caller is still holding, the telephone rings. If you perform a hookflash again before the third party answers, the new call is dropped and the original call resumes.

Step 3 After the third party answers, you can perform a hookflash to obtain a third dial tone. You now have the following options:

a. To transfer holding party to the currently active party, press **#** then **2** on your telephone keypad.

b. To maintain the current state, press any other digit or let a time out occur (in four seconds by default).

Step 4 If you hang up while talking to one of the remote parties, you end the currently active call. However, if the other remote party is still holding, your phone will ring. If the previously active party has hung up, you can answer your phone and resume your conversation with the holding party.

Cisco VG248 Conference Call Procedure

Step 1 Perform a hookflash to place the current call on hold and obtain a second dial tone.

Step 2 Enter the telephone number or speed dial of the third party and wait for an answer. If you hang up before the third party answers, the new call is dropped. If the original caller is still holding, the telephone rings. If you perform a hookflash again before the third party answers, the new call is dropped and the original call resumes.

Step 3 After the third party answers, you can perform a hookflash to obtain a third dial tone. You now have the following options:

a. To conference with both parties, press **#** then **3** on your telephone keypad.

b. To maintain the current state, press any other digit or let a time out occur (in four seconds by default).

Step 4 If you hang up while talking to one of the remote parties, you end the currently active call. However, if the other remote party is still holding, your phone will ring. If the previously active party has hung up, you can answer your phone and resume your conversation with the holding party.

Cisco ATA Style

The following three procedures are unique to the Cisco ATA style:

- Cisco ATA Style Call Hold/Resume Procedure, page A-6
- Cisco ATA Style Call Transfer Procedure, page A-6
- Cisco ATA Style Conference Calling Procedure, page A-7

Cisco ATA Style Call Hold/Resume Procedure

Step 1 To place the current call on hold, perform a hookflash, then press **1** on your telephone keypad.

Step 2 To resume the call, perform a hookflash again.

Cisco ATA Style Call Transfer Procedure

Step 1 While engaged in a call, perform a hookflash, then press **2** on your telephone keypad.

Step 2 After the dial tone sounds, enter the telephone number.

Step 3 When the other party answers or the remote telephone rings, hang up to transfer the call. You can perform a hookflash at any time to halt the operation and resume the original call.

Cisco ATA Style Conference Calling Procedure

Step 1 While engaged in a call, perform a hookflash, then press **3** on your telephone keypad.

Step 2 When you get a dial tone, dial the telephone number of the third party with whom you want to conference.

Step 3 When the other party answers or the remote telephone rings, perform a hookflash. You can hang up at any time to halt adding the new party to the conference.

Step 4 After you hang up, the telephone rings if the original party is still holding.

Voice Menu Codes

This section contains a quick-reference list of the voice configuration menu options for the Cisco ATA. For information on the use of the voice menu, see "Chapter 3, "Configuring the Cisco ATA for SCCP."

This section contains the following tables:

- Cisco ATA Voice Menu Codes—Information Options, page B-1
- Cisco ATA Voice Menu Codes—Configuration Parameters, page B-2
- Cisco ATA Voice Menu Codes—Software Upgrade, page B-3

Note Follow each voice menu code with **#**.

Note The term *Cisco ATA* is used throughout this manual to refer to both the Cisco ATA 186 and the Cisco ATA 188, unless differences between the Cisco ATA 186 and Cisco ATA 188 are explicitly stated.

Table B-1 lists codes to return basic Cisco ATA information.

Table B-1 Cisco ATA Voice Menu Codes—Information Options

Option	Voice Menu Code	Description
Build information	123123	Build date of the Cisco ATA software
Review IP address	21	Returns IP address of the Cisco ATA
Review MAC address	24	Returns media access control (MAC) address of the Cisco ATA
Review network route IP address	22	Returns IP address of the network route
Review subnet mask	23	Returns subnet mask of the network route
Version number	123	Returns version number of the Cisco ATA software

Table B-2 lists configuration codes. For additional information about these parameters, see "Chapter 5, "Parameters and Defaults."

Table B-2 Cisco ATA Voice Menu Codes—Configuration Parameters

Option	Voice Menu Code	Description
Audio mode	312	Allows finer control of the audio component to suit certain user applications
Caller ID method	316	Specifies the signal format when generating the Caller ID format to use
Connection mode	311	Controls the connection mode of the call signaling protocol
Dynamic Host Configuration Protocol (DHCP)	20	Controls whether the Cisco ATA can automatically obtain configuration parameters from a server over the network
DNS 1 IP	916	IP address of the primary DNS server
DNS 2 IP	917	IP address of the secondary DNS server
Encrypt key	320	Encrypts the configuration file on the TFTP server
Num Tx frames	35	Number of frames transmitted per packet
Static IP address	1	IP address of the Cisco ATA
LBR codec	300	Low-bit-rate codec selection
Media port	202	Specifies which base port the Cisco ATA uses to receive RTP media streams
Static network route address	2	Network router address
NPrintf address	81	IP address of a host to which all Cisco ATA debug messages are sent
Set password	7387277	Configuration interface password
Signal timers	318	Timeout values controlling the starting or stopping of a signaling event
MGCP protocol	38	Selects the signaling protocol
Static subnet mask	10	Specifies the subnet mask for the Cisco ATA
TFTP URL	905	When TFTP configuration is used, IP address of the TFTP server
UDP TOS bits	255	Determines the precedence and delay of UDP IP packets
Use TFTP	305	Enables TFTP as configuration method

Table B-3 lists codes used in the software upgrade process. For information about these codes, see "Appendix , "Upgrading the Cisco ATA Signaling Image."

Table B-3 Cisco ATA Voice Menu Codes—Software Upgrade

Option	Voice Menu Code	Description
Upgrade software	100	Used in the software process to enter the IP address of the PC
Upgrade language to English	101	When upgrading software, changes or upgrades the voice prompt language to English

Cisco ATA Specifications

This section describes the Cisco ATA specifications:

- Physical Specifications, page C-1
- Electrical Specifications, page C-2
- Environmental Specifications, page C-2
- Immunity Specifications, page C-2
- Physical Interfaces, page C-3
- Ringing Characteristics, page C-3
- Software Specifications (All Protocols), page C-3

Note The term *Cisco ATA* is used throughout this manual to refer to both the Cisco ATA 186 and the Cisco ATA 188, unless differences between the Cisco ATA 186 and Cisco ATA 188 are explicitly stated.

Physical Specifications

Table C-1 Physical Specifications

Description	Specification
Dimensions	1.5 x 6.5 x 5.75 in. (3.8 x 16.5 x 14.6 cm) (H x W x D)
Weight	15 oz (425 g)

Electrical Specifications for Cisco ATA

Table C-2 Electrical Specifications

Description	Specification
Power	3.5 to 7.5W (idle to peak)
DC input voltage	+5.0 VDC at 1.5A maximum
Power adaptor	Universal AC/DC ~3.3 x 2.0 x 1.3 in. (~8.5 x 5.0 x 3.2 cm) ~4.8 oz (135 g) for the AC-input external power adaptor ~4 ft (1.2 m) DC cord 6 ft (1.8 m) cord

Environmental Specifications

Table C-3 Environmental Specifications

Description	Specification
Operating temperature	41 to 104° F (5 to 40° C)
Storage temperature	–4 to 140° F (–20 to 65° C)
Relative humidity	10 to 90% noncondensing, operating, and nonoperating/storage

Immunity Specifications

EN50082-1, including the following:

- EN61000-3-2, Electromagnetic Compatibility
- EN61000-3-3, Electromagnetic Compatibility
- EN61000-4-2, ESD
- EN61000-4-3, Radiated Immunity
- EN61000-4-4, Burst Transients
- EN61000-4-5, Surge
- EN61000-4-6, Injected RF
- EN61000-4-11, Dips and Sags

Physical Interfaces

Table C-4 Physical Interfaces

Description	Specification
Ethernet	Two RJ-45, IEEE 802.3 10BASE-T standard
Analog telephone	Two RJ-11 FXS voice ports
Power	5 VDC power connector
Indicators	Function button with integrated status indicator Link and activity LED indicating network activity

Ringing Characteristics

Table C-5 Ringing Characteristics

Description	Specification
Tip/ring interfaces for each RJ-11 FXS port (SLIC)	
Ring voltage	$40V_{RMS}$ (typical, balanced ringing only)
Ring frequency	25 Hz
Ring waveform	Trapezoidal with 1.2 to 1.6 crest factor
Ring load	1400 ohm + 40 microF (per line)
Ringer equivalence number (REN)	Up to 5 REN per RJ-11 FXS port
Loop impedance	Up to 200 ohms (plus 430-ohm maximum telephone DC resistance)
On-hook/off-hook characteristics	
On-hook voltage (tip/ring)	–50V
Off-hook current	25 mA (nominal)
RJ-11 FXS port terminating impedance option	The Cisco ATA186-I1 and Cisco ATA188-I1 provide 600-ohm resistive impedance. The Cisco ATA186-I2 and Cisco ATA188-I2 provide 270 ohm + 750 ohm // 150-nF complex impedance.

Software Specifications

Table C-6 Software Specifications (All Protocols)

Description	Specification
Call progress tones	Configurable for two sets of frequencies and single set of on/off cadence
Dual-tone multifrequency (DTMF)	DTMF tone detection and generation

Table C-6 Software Specifications (All Protocols) (continued)

Description	Specification
Fax	G.711 fax pass-through and G.711 fax mode. Enhanced fax pass-through is supported on the Cisco ATA. Success of fax transmissions up to 14.4 kbps depends on network conditions, and fax modem/fax machine tolerance to those conditions. The network must have reasonably low network jitter, network delay, and packet-loss rate.
Line-echo cancellation	• Echo canceller for each port • 8 ms echo length • Nonlinear echo suppression (ERL > 28 dB for frequency = 300 to 2400 Hz) • Convergence time = 250 ms • ERLE = 10 to 20 dB • Double-talk detection
Out-of-band DTMF	• H.245 out-of-band DTMF for H.323 • RFC 2833 AVT tones for SIP, MGCP, SCCP
Configuration	• DHCP (RFC 2131) • Web configuration via built-in Web server • Touch-tone telephone keypad configuration with voice prompt • Basic boot configuration (RFC 1350 TFTP Profiling) • Dial plan configuration • Cisco Discovery Protocol for SCCP
Quality of Service	• Class-of-service (CoS) bit-tagging (802.1P) • Type-of-service (ToS) bit-tagging
Security	• H.235 for H.323 • RC4 encryption for TFTP configuration files
Voice coder-decoders (codecs)	**Note** In simultaneous dual-port operation, the second port is limited to G.711 when using G.729. • G.723.1 • G.729, G.729A, G.729AB • G.723.1 • G.711A-law • G.711µ-law

Table C-6 Software Specifications (All Protocols) (continued)

Description	Specification
Voice features	• Voice activity detection (VAD) • Comfort noise generation (CNG) • Dynamic jitter buffer (adaptive)
Voice-over-IP (VoIP) protocols	• H.323 v2 • SIP (RFC 2543 bis) • MGCP 1.0 (RFC 2705) • MGCP 1.0/network-based call signalling (NCS) 1.0 profile • MGCP 0.1 • SCCP

SCCP Call Flows

This section describes basic call flows for the Cisco ATA:

- Supported SCCP Message Set, page D-1
- Call Flow Scenarios for Successful Calls, page D-3

Note The term *Cisco ATA* is used throughout this manual to refer to both the Cisco ATA 186 and the Cisco ATA 188, unless differences between the Cisco ATA 186 and Cisco ATA 188 are explicitly stated.

Supported SCCP Message Set

The SCCP message set includes three sections:

- Registration and management messages
  - StationRegister
  - StationReset
  - StationMediaPort
  - StationSpeedDialState
  - StationRegisterAck
  - StationRegister
  - StationIpPort
  - StationMediaPortList
  - StationForwardStatReq
  - StationSpeedDialStatReq
  - StationLineStatReq
  - StationConfigStatReq
  - StationTimeDateReq
  - StationButtonTemplateReq
  - StationVersionReq

  - StationCapabilitiesRes
  - StationServerReq
  - StationAlarm
- Call Control Messages
  - StationKeyPadButton
  - StationEnblocCall
  - StationStimulus
  - StationOffHook
  - StationOffHookwithCallingPartyNumber
  - StationOnHook
  - StationHookFlash
  - StationStartTone
  - StationStopTone
  - StationSetRinger
  - StationSetLamp
  - StationSetHkFDetect
  - StationSetSpeakerMode
  - StationSetMicroMode
  - StationCallInfo
  - StationDisplayText
  - StationClearDisplay
  - StationEnunciatorCommand
- Media Control Messages
  - StationStartMediaTransmission
  - StationStopMediaTransmission
  - StationStartSessionTransmission
  - StationStopSessionTransmission
  - StationMulticastMediaReception
  - StationMulticastMediaReceptionAck
  - StationStopMulticastMediaReception
  - StationStartMulticastTransmission
  - StationStopMulticastTransmission
  - StationOpenReceiveChannel
  - StationOpenReceiveChannelAck
  - StationCloseReceiveChannel

Call Flow Scenarios for Successful Calls

This section describes call flows for the following scenarios:

- Cisco ATA-to-Cisco CallManager, page D-3
- Cisco ATA-to-Cisco CallManager-to-Cisco ATA, page D-5

Each of the call flows includes a call diagram, an action descriptions table, and a sample log file.

Cisco ATA-to-Cisco CallManager

Figure D-1 Illustrates the Cisco ATA registering with Cisco CallManager:

Figure D-1 Cisco ATA-to-Cisco CallManager

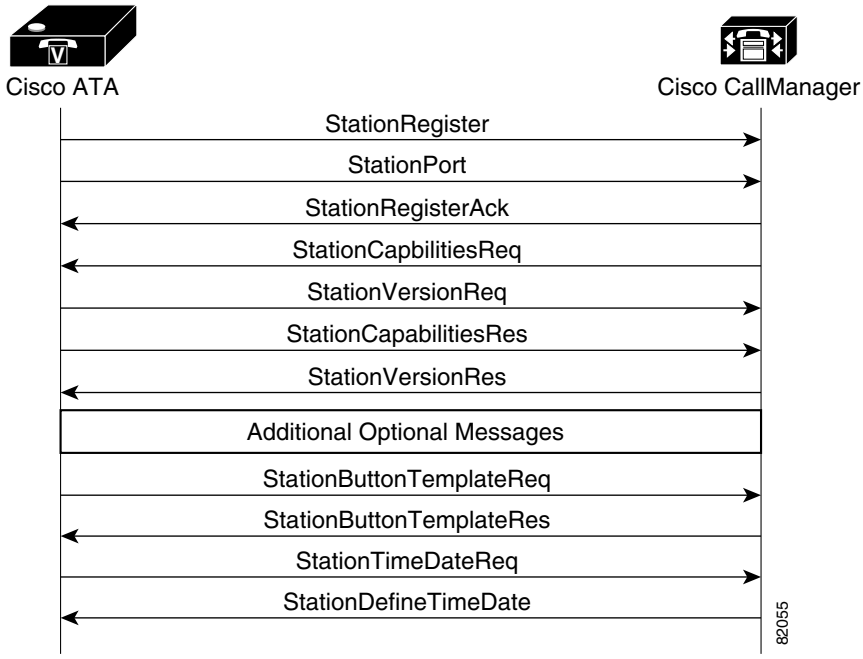


Table D-1 Action Descriptions for First Call Flow

Step	Action	Description
Step 1	StationRegister—Cisco ATA to Cisco CallManager	Cisco ATA sends a message to announce its existence to the Cisco CallManager.
Step 2	StationReset—Cisco CallManager to Cisco ATA	The Cisco CallManager commands the Cisco ATA to reset its processes.
Step 3	StationIpPort—Cisco ATA to Cisco CallManager	The Cisco ATA provides Cisco CallManager with the UDP port for the RTP stream.
Step 4	StationRegisterAck—Cisco CallManager to Cisco ATA	Cisco CallManager acknowledges the registration of the Cisco ATA.
Step 5	StationCapabilitiesReq—Cisco CallManager to Cisco ATA	Cisco CallManager requests the current capabilities of the Cisco ATA.
Step 6	StationVersionReq—Cisco ATA to Cisco CallManager	Cisco ATA requests the version number of the software.
Step 7	StationCapabilitiesRes—Cisco ATA to Cisco CallManager	Cisco ATA responds to the Station Capabilities Request message from the Cisco CallManager. These capabilities are cached in the Cisco CallManager and are used to negotiate terminal capabilities with an H.323-compliant terminal.
Step 8	StationVersionRes—Cisco CallManager to Cisco ATA	Cisco CallManager informs the Cisco ATA of the current software version number.
Step 9	StationButtonTemplateReq—Cisco ATA to Cisco CallManager	Cisco ATA requests the button template definition for that specific Cisco ATA.
Step 10	StationButtonTemplateRes—Cisco CallManager to Cisco ATA	Cisco CallManager updates the button template information contained in the Cisco CallManager.
Step 11	StationTimeDateReq—Cisco ATA to Cisco CallManager	Cisco ATA requests the current date and time for internal usage and for displaying a text string.
Step 12	StationDefineTimeDate—Cisco CallManager to Cisco ATA	Cisco CallManager provides the date and time information to the Cisco ATA.

Cisco ATA-to-Cisco CallManager-to-Cisco ATA

Figure D-2 illustrates the call flow between Cisco ATA 1 and Cisco ATA 2 through a Cisco CallManager. The call flow is as follows:

Figure D-2 Cisco ATA-to-Cisco CallManager-to-Cisco ATA

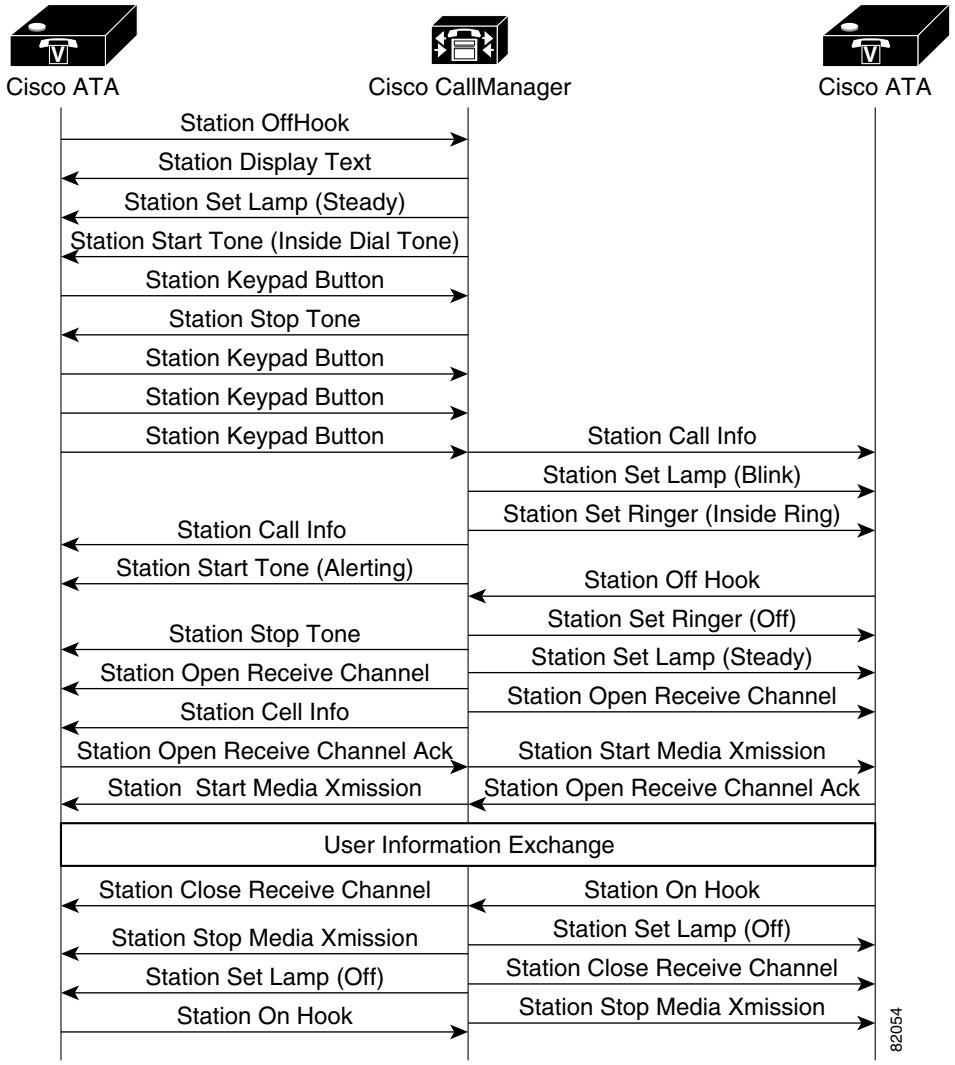


Table D-2 Action Descriptions for Second Call Flow

Step	Station Call Info	Description
Step 1	Station OffHook—Cisco ATA 1 to Cisco CallManager	Cisco ATA 1 informs the Cisco CallManager that Cisco ATA 1 is not in an OffHook condition, and simultaneously provides calling party number information to the Cisco CallManager.
Step 2	Station Set Lamp (Steady)—Cisco CallManager to Cisco ATA 1	When the Cisco ATA detects that one port is in an off-hook state, the Cisco ATA turns on the lamp, then turns off the lamp once both ports are in the on-hook state.

Step	Station Call Info	Description
Step 3	Station Start Tone (Inside Dial Tone)—Cisco CallManager to Cisco ATA 1	Cisco CallManager commands Cisco ATA 1 to play a specified tone. If the Cisco ATA is currently playing a tone, the indicated tone takes precedence. If the definition is continuous, the Cisco ATA plays it until receiving a StationStopTone message. If the tone definition contains a duration value, the Cisco ATA stops playing the tone at the expiration of the duration. See also Bellcore SR-TSV-002275.
Step 4	Station Keypad Button—Cisco ATA 1 to Cisco CallManager	Cisco ATA 1 informs the Cisco CallManager when a keypad digit is pressed.
Step 5	Station Stop Tone—Cisco CallManager to Cisco ATA 1	Cisco CallManager commands Cisco ATA1 to stop playing the current tone.
Step 6	Station Keypad Button—Cisco ATA 1 to Cisco CallManager	Cisco ATA 1 informs the Cisco CallManager when a keypad digit is pressed.
Step 7	Station Keypad Button—Cisco ATA 1 to Cisco CallManager	Cisco ATA 1 informs the Cisco CallManager when a keypad digit is pressed.
Step 8	Station Keypad Button—Cisco ATA 1 to Cisco CallManager	Cisco ATA 1 informs the Cisco CallManager when a keypad digit is pressed.
Step 9	Station Call Info—Cisco CallManager to Cisco ATA 2	Cisco CallManager informs Cisco ATA 2 of called and calling party identification information.
Step 10	Station Set Lamp (Blink)—Cisco CallManager to Cisco ATA 2	When the Cisco ATA detects that one port is in an off-hook state, the Cisco ATA turns on its Function button, then turns off the Function button once both ports are in the on-hook state.
Step 11	Station Set Ringer (Inside Ring)—Cisco CallManager to Cisco ATA 2	Cisco CallManager commands Cisco ATA 2 to set an audible inside ringing mode. Ring modes are derived from Bellcore SR-TSV-002275.
Step 12	Station Call Info—Cisco CallManager to Cisco ATA 1	Cisco CallManager informs Cisco ATA 1 of called and calling party identification information.
Step 13	Station Start Tone (alerting)—Cisco CallManager to Cisco ATA 1	Cisco CallManager commands Cisco ATA 1 to play an alert tone. If Cisco ATA 1 is currently playing a tone, the indicated tone takes precedence. If the definition is continuous, the Cisco ATA plays it until receiving a StationStopTone message. If the tone definition contains a duration value, the Cisco ATA stops playing the tone at the expiration of the duration. See also Bellcore SR-TSV-002275.
Step 14	Station OffHook—Cisco ATA 2 to Cisco CallManager	Cisco ATA 2 informs the Cisco CallManager that Cisco ATA 2 is not in an Off Hook condition, and simultaneously provides calling party number information to the Cisco CallManager.
Step 15	Station Set Ringer (Off)—Cisco CallManager to Cisco ATA 2	Cisco CallManager commands Cisco ATA 2 to set a specified audible ringing mode. Ring modes are derived from Bellcore SR-TSV-002275.
Step 16	Station Stop Tone—Cisco CallManager to Cisco ATA 1	Cisco CallManager commands Cisco ATA 1 to stop playing the current tone.
Step 17	Station Set Lamp (Steady)—Cisco CallManager to Cisco ATA 2	When the Cisco ATA detects that one port is in an off-hook state, the Cisco ATA turns on its function button, then turns off the Function button once both ports are in the on-hook state.

Step	Station Call Info	Description
Step 18	Station Open Receive Channel—Cisco CallManager to Cisco ATA 1	Cisco CallManager allows Cisco ATA 1 to begin receiving a unicast RTP stream.
Step 19	Station Open Receive Channel—Cisco CallManager to Cisco ATA 2	Cisco CallManager allows Cisco ATA 2 to begin receiving a unicast RTP stream.
Step 20	Station Call Info—Cisco CallManager to Cisco ATA 1	Cisco CallManager informs Cisco ATA 1 of called and calling party identification information.
Step 21	Station Open Receive Channel Ack—Cisco ATA 1 to Cisco CallManager	Cisco ATA 1 provides the following information to the Cisco CallManager: • Status of the open action • Receive-port address and number for transmission to the remote end.
Step 22	Station Start Media Transmission—Cisco CallManager to Cisco ATA 2	Cisco CallManager commands Cisco ATA 2 to become the source for the multicast address.
Step 23	Station Open Receive Channel Ack—Cisco ATA 2 to Cisco CallManager	Cisco ATA 2 provides the following information to the Cisco CallManager: • Status of the open action • Receive-port address and number for transmission to the remote end.
Step 24	Station Start Media Transmission—Cisco CallManager to Cisco ATA 1	Cisco CallManager commands Cisco ATA 1 to become the source for the multicast address.
Step 25	Station On Hook—Cisco ATA 2 to Cisco CallManager	Cisco ATA 2 informs the Cisco CallManager that the Cisco ATA is now in an On Hook condition.
Step 26	Station Close Receive channel—Cisco CallManager to Cisco ATA 1	Cisco CallManager terminates the reception of an RDT stream between Cisco ATA 1 and Cisco ATA 2.
Step 27	Station Set Lamp (Off)—Cisco CallManager to Cisco ATA 2	When the Cisco ATA detects that one port is in an off-hook state, the Cisco ATA turns on its Function button, then turns off the Function button once both ports are in the on-hook state.
Step 28	Station Stop Media transmission—Cisco CallManager to Cisco ATA 1—Cisco CallManager to Cisco ATA 2	Cisco CallManager stops Cisco ATA 1 from being the source of the RTP stream in a multicast conference.
Step 29	Station Close Receive Channel—Cisco CallManager to Cisco ATA 2	Cisco CallManager terminates the reception of an RDT stream between Cisco ATA 1 and Cisco ATA 2.
Step 30	Station Set Lamp (Off)—Cisco CallManager to Cisco ATA 1	When the Cisco ATA detects that one port is in an off-hook state, the Cisco ATA turns on its Function button, then turns off the Function button once both ports are in the on-hook state.
Step 31	Station Stop Media Transmission—Cisco CallManager to Cisco ATA 2	Cisco CallManager terminates the reception of an RDT stream between Cisco ATA 1 and Cisco ATA 2.
Step 32	Station On Hook—Cisco ATA 1 to Cisco CallManager	Cisco ATA informs the Cisco CallManager that Cisco ATA 1 is now in an On Hook condition.

Performing a Cross-Protocol Upgrade

This section describes how to perform an upgrade from the SCCP signaling image to either the MGCP, SIP or H.323 signaling images.

You can configure the Cisco ATA to automatically download a new signaling image that the Cisco CallManager administrator has stored on the TFTP server. You do this by configuring the parameter *upgradecode* in your Cisco ATA configuration file. For more information about setting up the configuration file, see the "Creating a Configuration File for a Specific Cisco ATA" section on page 3-12.

Syntax of upgradecode Parameter

```
upgradecode:3,0x301,0x0400,0x0200,tftp_server_ip,69,image_id,image_file_name
```

Definitions

- The hexadecimal values that precede the tftp_server_ip variable must always be the values shown in the syntax.
- `tftp_server_ip` is the TFTP server that contains the latest signaling image file.
- `image_id` is a unique 32-bit integer that differs with each upgrade. You can determine this 32-bit integer value by using the build date on the image file name and prepending it with "0x". For example, if the image_file_name is ata186-v2-14-020514a.kxz, then the build date is 020508a, and the image_id is 0x020508a).
- `image_file_name` is the signaling upgrade-image file name. The image_file_name format is:

  `ata186-v{M}-{N}-{yymmdd}{a-f}{ext}`

  - `M` is the major version number
  - `N` is the minor version number (always two digits)
  - `yymmdd` is a two-digit year, two-digit month, and two-digit day
  - `a-f` is the build letter (**- yymmdd** and **a-f** together form the build date of the image)
  - `ext` must be ".kxz" for upgrading from version 2.11 and below, and can be ".zup" for upgrading from version 2.12 and up for the Cisco ATA186, but it *must* be ".zup" for upgrading the Cisco ATA188.

Process

Whenever the Cisco CallManager administrator stores a new signaling image (denoted by a change to the image_id) on the TFTP server, the Cisco ATA updates its firmware with the new image_file_name. To contact the TFTP server, the Cisco ATA uses the TFTP server IP address that is contained within the value of the *upgradecode* parameter.

Example

The upgradecode parameter value could be:

```
upgradecode:3,0x301,0x0400,0x0200,192.168.2.170,69,0x020723a,ata186-v2-15-020
723a.zup
```

This instructs the Cisco ATA to update its firmware to ata186-v2-15-020723a.zup by downloading the ata186-v2-15-020723a.zup file from the TFTP server IP address of 192.168.2.170. This download occurs after the Cisco ATA downloads its configuration file that contains the directive from the upgradecode parameter. Also, the upgrade occurs only if the internally cached image_id in Cisco ATA is different from the value 0x020723a.

Numerics

10BASE-T 10-Mbps baseband Ethernet specification using two pairs of twisted-pair cabling (Categories 3, 4, or 5): one pair for transmitting data and the other for receiving data. 10BASE-T, which is part of the IEEE 802.3 specification, has a distance limit of approximately 328 feet (100 meters) per segment.

A

A-law ITU-T companding standard used in the conversion between analog and digital signals in PCM systems. A-law is used primarily in European telephone networks and is similar to the North American μ-law standard. See also companding and μ-law.

AVT tones Out-of-bound signaling as defined in RFC 2833.

C

category-3 cable One of five grades of UTP cabling described in the EIA/TIA-586 standard. Category 3 cabling is used in 10BASE-T networks and can transmit data at speeds up to 10 Mbps.

CED tone detection Called station identification. A three-second, 2100 Hz tone generated by a fax machine answering a call, which is used in the hand-shaking used to set the call; the response from a called fax machine to a CNG tone.

CELP Code excited linear prediction compression. Compression algorithm used in low bit-rate voice encoding. Used in ITU-T Recommendations G.728, G.729, G.723.1.

CLIP Calling Line Identification Presentation. Shows your identity to callers with Caller ID.

CLIR Calling Line Identification Restriction. Hides your identity from callers with Caller ID.

CNG Comfort Noise Generation.

codec Coder/decoder. In Voice over IP, Voice over Frame Relay, and Voice over ATM, a DSP software algorithm used to compress/decompress speech or audio signals.

companding Contraction derived from the opposite processes of compression and expansion. Part of the PCM process whereby analog signal values are rounded logically to discrete scale-step values on a nonlinear scale. The decimal step number then is coded in its binary equivalent prior to transmission. The process is reversed at the receiving terminal using the same nonlinear scale. Compare with compression and expansion. See also A-law and μ-law.

compression The running of a data set through an algorithm that reduces the space required to store or the bandwidth required to transmit the data set. Compare with companding and expansion.

CoS Class of service. An indication of how an upper-layer protocol requires a lower-layer protocol to treat its messages. In SNA subarea routing, CoS definitions are used by subarea nodes to determine the optimal route to establish a given session. A CoS definition comprises a virtual route number and a transmission priority field.

D

DHCP Dynamic Host Configuration Protocol. Provides a mechanism for allocating IP addresses dynamically so that addresses can be reused when hosts no longer need them.

dial peer An addressable call endpoint. In Voice over IP (VoIP), there are two types of dial peers: POTS and VoIP.

DNS Domain Name System. System used on the Internet for translating names of network nodes into addresses.

DSP Digital signal processor. A DSP segments the voice signal into frames and stores them in voice packets.

DTMF Dual tone multifrequency. Tones generated when a button is pressed on a telephone, primarily used in the U.S. and Canada.

E

E.164 The international public telecommunications numbering plan. A standard set by the ITU-T which addresses telephone numbers.

endpoint A SIP terminal or gateway. An endpoint can call and be called. It generates and/or terminates the information stream.

expansion The process of running a compressed data set through an algorithm that restores the data set to its original size. Compare with companding and compression.

F

firewall Router or access server, or several routers or access servers, designated as a buffer between any connected public networks and a private network. A firewall router uses access lists and other methods to ensure the security of the private network.

FoIP Fax over IP

FQDN Fully Qualified Domain (FQDN) format “mydomain.com” or “company.mydomain.com.”

FSK Frequency shift key.

FXO Foreign Exchange Office. An FXO interface connects to the public switched telephone network (PSTN) central office and is the interface offered on a standard telephone. Cisco FXO interface is an RJ-11 connector that allows an analog connection at the PSTN central office or to a station interface on a PBX.

FXS Foreign Exchange Station. An FXS interface connects directly to a standard telephone and supplies ring, voltage, and dial tone. Cisco's FXS interface is an RJ-11 connector that allows connections to basic telephone service equipment, keysets, and PBXs.

G

G.711 Describes the 64-kbps PCM voice coding technique. In G.711, encoded voice is already in the correct format for digital voice delivery in the PSTN or through PBXs. Described in the ITU-T standard in its G-series recommendations.

G.723.1 Describes a compression technique that can be used for compressing speech or audio signal components at a very low bit rate as part of the H.324 family of standards. This Codec has two bit rates associated with it: 5.3 and 6.3 kbps. The higher bit rate is based on ML-MLQ technology and provides a somewhat higher quality of sound. The lower bit rate is based on CELP and provides system designers with additional flexibility. Described in the ITU-T standard in its G-series recommendations.

G.729A Describes CELP compression where voice is coded into eight-kbps streams. There are two variations of this standard (G.729 and G.729 Annex A) that differ mainly in computational complexity; both provide speech quality similar to 32-kbps ADPCM. Described in the ITU-T standard in its G-series recommendations.

gateway A gateway allows SIP or H.323 terminals to communicate with terminals configured to other protocols by converting protocols. A gateway is the point where a circuit-switched call is encoded and repackaged into IP packets.

H

H.245 An ITU standard that governs H.245 endpoint control.

H.323 H.323 allows dissimilar communication devices to communicate with each other by using a standard communication protocol. H.323 defines a common set of CODECs, call setup and negotiating procedures, and basic data transport methods.

I

ICMP Internet Control Message Protocol

IP Internet Protocol. Network layer protocol in the TCP/IP stack offering a connectionless internetwork service. IP provides features for addressing, type-of-service specification, fragmentation and reassembly, and security. Defined in RFC 791.

IVR Interactive voice response. Term used to describe systems that provide information in the form of recorded messages over telephone lines in response to user input in the form of spoken words or, more commonly, DTMF signaling.

L

LDAP Lightweight DirectoryAccess Protocol

LEC Local exchange carrier.

Location Server A SIP redirect or proxy server uses a location server to get information about a caller's location. Location services are offered by location servers.

M

MGCP Media Gateway Control Protocol.

MWI Message-waiting indication.

μ-law North American companding standard used in conversion between analog and digital signals in PCM systems. Similar to the European A-law. See also A-law and companding.

N

NAT Network Address Translation. Mechanism for reducing the need for globally unique IP addresses. NAT allows an organization with addresses that are not globally unique to connect to the Internet by translating those addresses into globally routable address spaces. Also known as Network Address Translator.

NSE packets Real-Time Transport Protocol (RTP) digit events are encoded using the Named Signaling Event (NSE) format specified in RFC 2833, Section 3.0.

NAT Server Network Address Translation. an Internet standard that enables a local-area network (LAN) to use one set of IP addresses for internal traffic and a second set of addresses for external traffic.

NTP Network Time Protocol. Protocol built on top of TCP that assures accurate local time-keeping with reference to radio and atomic clocks located on the Internet. This protocol is capable of synchronizing distributed clocks within milliseconds over long time periods.

P

POTS Plain old telephone service. Basic telephone service supplying standard single-line telephones, telephone lines, and access to the PSTN.

Proxy Server An intermediary program that acts as both a server and a client for the purpose of making requests on behalf of other clients. Requests are serviced internally or by passing them on, possibly after translation, to other servers. A proxy interprets and, if necessary, rewrites a request message before forwarding it.

PSTN Public switched telephone network.

Q

QoS Quality of Service. The capability of a network to provide better service to selected network traffic over various technologies, including Frame Relay, Asynchronous Transfer Mode (ATM), Ethernet and 802.1 networks, SONET, and IP-routed networks that may use any or all of these underlying technologies. The primary goal of QoS is to provide priority including dedicated bandwidth, controlled jitter and latency (required by some real-time and interactive traffic), and improved loss characteristics.

R

Redirect Server A redirect server is a server that accepts a SIP request, maps the address into zero or more new addresses, and returns these addresses to the client. It does not initiate its own SIP request or accept calls.

Registrar Server A registrar server is a server that accepts Register requests. A registrar is typically co-located with a proxy or redirect server and may offer location services.

router Network layer device that uses one or more metrics to determine the optimal path along which network traffic should be forwarded. Routers forward packets from one network to another based on network layer information. Occasionally called a gateway (although this definition of gateway is becoming increasingly outdated). Compare with gateway.

RTP Real-Time Transport Protocol. One of the IPv6 protocols. RTP is designed to provide end-to-end network transport functions for applications transmitting real-time data, such as audio, video, or simulation data, over multicast or unicast network services. RTP provides services such as payload type identification, sequence numbering, timestamping, and delivery monitoring to real-time applications.

S

SCCP Signaling connection control part.

SDP Session Definition Protocol. An IETF protocol for the definition of Multimedia Services. SDP messages can be part of SGCP and MGCP messages.

SIP Session Initiation Protocol. Protocol developed by the IETF MMUSIC Working Group as an alternative to H.323. SIP features are compliant with IETF RFC 2543, published in March 1999. SIP equips platforms to signal the setup of voice and multimedia calls over IP networks.

SIP endpoint A terminal or gateway that acts as a source or sink of Session Initiation Protocol (SIP) voice data. An endpoint can call or be called, and it generates or terminates the information stream.

SLIC Subscriber Line Interface Circuit. An integrated circuit (IC) providing central office-like telephone interface functionality.

SOHO Small office, home office. Networking solutions and access technologies for offices that are not directly connected to large corporate networks.

T

TCP Transmission Control Protocol. Connection-oriented transport layer protocol that provides reliable full-duplex data transmission. TCP is part of the TCP/IP protocol stack.

TFTP Trivial File Transfer Protocol. Simplified version of FTP that allows files to be transferred from one computer to another over a network, usually without the use of client authentication (for example, username and password).

TN power systems A TN power system is a power distribution system with one point connected directly to earth (ground). The exposed conductive parts of the installation are connected to that point by protective earth conductors.

TOS Type of service. See CoS.

U

UAC User agent client. A client application that initiates the SIP request.

UAS User agent server (or user agent). A server application that contacts the user when a SIP request is received, and then returns a response on behalf of the user. The response accepts, rejects, or redirects the request.

UDP User Datagram Protocol. Connectionless transport layer protocol in the TCP/IP protocol stack. UDP is a simple protocol that exchanges datagrams without acknowledgments or guaranteed delivery, requiring that error processing and retransmission be handled by other protocols. UDP is defined in RFC 768.

user agent See UAS.

V

VAD Voice activity detection. When enabled on a voice port or a dial peer, silence is not transmitted over the network, only audible speech. When VAD is enabled, the sound quality is slightly degraded but the connection monopolizes much less bandwidth.

voice packet gateway Gateway platforms that enable Internet telephony service providers to offer residential and business-class services for Internet telephony.

VoIP Voice over IP. The capability to carry normal telephony-style voice over an IP-based Internet with POTS-like functionality, reliability, and voice quality. VoIP enables a router to carry voice traffic (for example, telephone calls and faxes) over an IP network. In VoIP, the DSP segments the voice signal into frames, which then are coupled in groups of two and stored in voice packets. VoIP is a blanket term, which generally refers to Cisco's standard-based (for example H.323) approach to IP voice traffic.

X

XML eXtensible Markup Language. Designed to enable the use of SGML on the World-Wide Web. XML allow you to define your own customized markup language.

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